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The British House of Lords has confirmed a decision of the county court at Liverpool compelling an employer to pay indemnity, under the Workmen's Compensation Act, to the widow of a man who dropped dead from aneurism of the aorta while at work tightening a rivet. The court held that this was an accident sustained in the course of employment, though the doctors testified that the weakness or debility of the artery was so advanced that the man might have died while asleep. This being so, the employer claimed that the occurrence was not an accident, as contemplated by the law. Physicians generally hold, where a diseased condition is the immediate cause of a workman's death, that any external happening accidentally arising in the course of a man's employment is not to be considered as a cause. It appears that the English courts have held that the term "accident" was to include cases where "something goes wrong with the human frame itself," such as the breaking of a blood vessel. If such a case is to be deemed accidental, then there must be some standard beyond which the man must not exert himself and, of course, no such standard can be established; for there would have to be a different one for men of different ages. The result of this interpretation of the law probably will be to drive employers rigidly to exclude from their service men with weak hearts or other bodily infirmities which are liable to develop sudden failures. The adoption of strict regulations by the employers will thus tend to throw out of work considerable numbers of men who, notwithstanding debility or chronic disease, desire to earn a livelihood, and who, under favorable conditions, are competent to do so. *Engineering*, which discusses this subject, thinks that the only solution of the difficulty will be to repeal the Workmen's Compensation Act and adopt in its place some national scheme of insurance.

E. E. Mote, manager of the Pacific Car Service Bureau, reports for February, the eighth month in which the California $6 demurrage rate had been in effect, that of the cars subject to that rate the percentage held overtime was only 0.87, the lowest figure yet shown. Of cars which contained interstate shipments and which, therefore, were subject to a rate of only $1 a day, the percentage held overtime was 4.30 in California and 5.43 in other territory. This difference between the result in California and that in other states would seem to indicate that the habit of unloading intrastate shipments promptly had influenced consignees to unload all shipments more promptly than formerly. The total amount of demurrage charged in California during the eight months ending with February was considerably less than in the preceding eight months, although the number of cars handled was about 23 per cent. more, showing that the high demurrage rate had its normal effect of reducing the use of cars as storehouses rather than imposing penalties on consignees. Mr. Mote has inquired of railway superintendents if they found that shippers were loading cars with the smallest possible quantity of freight in order to avoid demurrage, but the replies that he gets seem to indicate that such is not the case. Shippers are more careful than formerly not to order cars before they need them. The general manager of an electric line which does a considerable freight business thinks that a charge of $5 would be as effective as $6 a day.

Running the engine with the cab to the front, as in the case of Mallet locomotives, illustrated elsewhere in this issue, is the natural outcome of the increasing length of these engines. There was much comment, at the time the first of these excessively long machines were built, on the fact that the engineman had but little chance to see his rails ahead of him. In fact, he could see almost nothing of them except on curves to the right; and it was suggested that it would be well to move the cab to the front and place it over the waist of the boiler, as is done on the culm burners of the anthracite roads. The idea of running the cab at the front is not, however, a new one. When Forney patented his 0-4-4 locomotive, one of the claims he made for it was that it was designed to be run with the cab to the front, and thus give the driver a clear and unobstructed view of the rails ahead. But the idea did not take, and the engines were usually run in the regular way, except when used in a service where they were not turned at the end of a run. The question is as to how much additional safety is obtained by putting the driver where he can see the rails. On even the old-time light locomotives, the machine was running into an unknown territory whenever it was on a curve to the left or on a curve in a cut. And as for night work, the oil headlight would never have shown anything on the track at speeds of 50 miles an hour, in time to stop; so all our night work is practically done without a view ahead. European drivers do not even have the glimmer in front for company. Still, the idea of putting the driver where he can see what he is coming to before he gets there is a good one, and the arrangement of these oil burners should be widely imitated on similar engines.

The Woods Public Utilities bill, which has been passed by the Ohio House and is pending in the Senate, illustrates the current tendency to subject public service corporations to more and more detailed regulation. It has not been many years since there was pretty general agreement that regulation should be confined to fixing maximum rates and to a few requirements regarding service. It was then felt that so long as a few restrictions and requirements imposed for the protection of the public were observed the officers of public utilities should be allowed to operate them, as was once said by a distinguished federal judge, "upon the same principles which are regarded as sound and adopted in other trades and pursuits." The Woods bill carries to the logical extreme the theory prevalent now, that public authorities should interfere as much with the business of public utilities as, by the most extreme interpretation, can be held to be constitutional. It proposes to give the commission which it would create the power to fix not merely the maximum rates but the absolute rates to be charged by every public utility in Ohio; and no rate could be changed without the commission's consent. It specifically empowers the commission to prescribe the way that the accounts of all public utilities shall be kept, to fix the amount of the depreciation accounts that each shall carry, and to do many other things which it has heretofore been assumed should be left to the companies' managers. Finally, to make sure that the commission shall have all the authority and discretion that it may need to compel public utilities to do anything and everything that may seem good to it, the bill makes the sweeping provision that "the commission is vested with the power and jurisdiction to supervise and regulate every public utility in this state, and to do all things necessary *and convenient* in the exercise of such power and jurisdiction." In other words, it proposes to constitute the commission, the board of directors, the president, all the vice-presidents, the general manager, the traffic manager and the general auditor of every public service corporation in the State, and to make those who now hold these offices merely the commission's clerks and messengers. It would seem that no effort and no expense should be spared to get the most capable and expert men to perform duties of such magnitude and importance. Yet the bill provides salaries of only $5,000 per year each for the three members of the commission, and prescribes no qualifications for them, except that they shall not engage in politics, pursue any other business except the duties of their office, or have any pecuniary interest in any concern subject to the provisions of the act. One of the curious features of the situation is that there have apparently been in Ohio no abuses requiring, and no public agitation or demand for, the enactment of this or any other additional regulatory legislation. The Woods bill was substituted by the House for another bill almost without any discussion of it, and swiftly jammed through. Had not the Railway Business Association and representatives of the public utilities of Ohio appeared to protest against its enactment, it might have been made a law almost before the great majority of the people of the state knew that it had been introduced. The bill itself and the effort to hurry it upon the statute books without the public, or even the legislature, having had time or opportunity to consider it thoroughly, constitute a significant commentary on the spirit in which regulation of public utilities is now being carried on.

The number of persons killed in train accidents in the month of March, as shown in our list published to-day, was 158, and of injured 152; and the Government report, when it comes out three months hence, will show much larger numbers, of course. This frightfully large record well illustrates the fortuitous character of railway accident statistics. The worst accident in the list, that at Wellington, in the Cascade mountains, occurred under circumstances that can never affect ordinary railway operation, such as one has in mind when estimating the degree of safety with which our railways generally are managed; and the effect of this casualty list on the totals for the year is therefore quite abnormal. Nevertheless, this catastrophe occurred on an important through railway line, over which thousands of people travel every year in almost exactly the same frame of mind that possesses them when they ride over the prairies of Illinois. The derailment in Iowa is also quite unusual in that more than two score lives were sacrificed, while yet the speed of the train was low and there was no high precipice or rocky mountain or raging flood; no faulty bridge and no disastrous fire. In one particular, however, the circumstances of this accident were of a kind that is deplorably common; heavy, strong cars were mixed in the train with lighter ones, so that the lighter were quickly crushed by the heavier. Steel cars have already shown their value in collisions and derailments and the Rock Island road has been one of the foremost in introducing them; yet in this accident it pays the penalty of *not* having a train made up of cars of uniform size, weight and stiffness. In so far as this derailment was caused by running engines backward, the accident was again of a common kind; that is to say, many derailments occur under such circumstances when it seems quite probable that if the engine had been running "chimney first" it would have stayed on the track. Assuming that to turn these engines around would have been out of the question the point at issue was, How slowly must the train be run to insure safety? This had to be settled by the men in charge on the spot; and whether or not they, all of them, exercised good judgment may be a very difficult question to answer. To complete the picture of this month, so disastrous in the railway record, we must note a gigantic avalanche on the Canadian Pacific near Glacier, B. C., on the morning of March 5, about 1 o'clock, which buried and killed 50 or more men, with two rotary snow plows, and a rear collision at Mulheim on the Rhine, in Germany, March 30, in which 22 soldiers were killed.

THE NEW HAVEN'S RAISE OF PASSENGER FARES.

As an object lesson in the study of passenger fares and rates the New York, New Haven & Hartford stands unique among American railway properties and one may almost say among the railways of the world. Its great passenger density is familiar. For many years its passenger receipts exceeded the receipts from freight; and it was not until the New York & New England system, with its preponderating freight business, was acquired that an equation of freight and passenger receipts was reached. Since then freight business on the system has slowly forged ahead. Yet, for the calendar year 1909 passenger receipts were $24,035,266, as against freight receipts of $28,559,492. In any comparisons of passenger business it should be noted that in actual mileage—main line mileage—the New Haven system has remained almost stationary. In 1906 it had 2,056 miles, which in 1909 had actually decreased to 2,044. In the interval there had been additions of new tracks and sidings of 160 miles.

Many years ago the company reduced passenger rates over the 74 miles between New York and New Haven to 2 cents a mile, with resulting increase of passenger receipts between those points. Later the policy was extended to other parts of the system that had high passenger density, and, later still, to the whole system, in a modified sense, when a mileage book of a thousand miles was given for $20. The climax of the policy, in every case adopted *voluntarily*, came in 1906, when, beginning March 1 and ending November 1, a gradual reduction of tickets to 2 cents a mile on the whole system went into force. In his annual report for that year, written in the early autumn, President Mellen says: "Careful watch has been kept of the results and we are justified from the returns at hand in stating that the [passenger] business has been stimulated to such an extent that an increased income, both gross and net, is assumed as a result of the policy." Yet now, after nearly four years, the policy is reversed. The company has filed at Washington its notice of an increase of

10 cents on the fare between New York and Boston, which is understood to be preliminary to a pretty general lift of rates on the whole system, varying inversely with the passenger density of its various parts. The cause officially stated is the increase of wages forced by the employees of the company under the threat of a strike.

The situation on a railway property of this kind opens a subject of acute interest and of the utmost value, if its bearings on the economic ratio of passenger fares to gross passenger earnings can be ascertained. The fiscal year ending June 30 of the New Haven company would, if taken, split the sliding scale reduction of the eight months of 1906 in two parts. It is better, therefore, to take the calendar years from 1905 to 1909, inclusive, by months, which allow more accurate comparison for passenger revenue, not including excess baggage and other miscellaneous earnings. The tabulation is as follows:

	1905.	1906.	1907.	1908.	1909.
January ...	$1,376,963	$1,530,594	$1,594,016	$1,614,605	$1,687,333
February ..	1,261,977	1,378,539	1,428,238	1,509,917	1,577,792
March	1,464,601	1,513,632	1,678,095	1,620,589	1,744,098
April	1,625,820	1,697,672	1,782,568	1,761,321	1,900,736
May	1,690,828	1,750,870	1,896,496	1,766,743	1,954,455
June	1,753,286	1,922,768	1,971,738	1,829,733	1,977,426
July	1,962,653	2,042,011	2,239,262	1,981,177	2,269,960
August	2,035,472	2,175,649	2,497,167	2,144,227	2,301,121
September .	2,075,676	2,181,416	2,339,700	2,176,509	2,435,110
October ...	1,890,040	1,996,331	2,120,104	2,035,674	2,174,992
November .	1,720,178	1,769,874	1,947,149	1,885,188	2,054,786
December .	1,650,828	1,746,998	1,756,822	1,788,122	1,957,457
Total ...	$20,508,322	$21,706,354	$23,251,355	$22,113,805	$24,035,266

An analysis of the table shows some striking features. The year 1906, as stated, contains the eight months of final reduction to the two-cent a mile rate. Yet passenger gross earnings increased over 1905 $1,198,032, or somewhat more than 5 per cent. The year 1907, following the reduction, is yet more remarkable with its increase of gross passenger receipts over 1906 of $1,545,001, or a little more than 7 per cent. The year 1908 was the "post-panic" year with its general inroad on railway earnings. Gross passenger receipts fell off on the New Haven $1,137,550, or nearly 5 per cent. Yet passenger earnings maintained themselves better than freight, which fell off $3,636,898, or about 13 per cent. Finally, coming down to the calendar year 1909, passenger earnings leaped to a gain of $1,921,461, or nearly 9 per cent. During the three years since 1906, the year of the final reduction to 2 cents a mile, passenger earnings on the New Haven system have gained $2,328,912, or nearly 11 per cent.

In the face of such a showing, the New Haven's inversion of policy is a bold step. One might have expected, perhaps, an increase of freight rates as a substitute or, at least, as an antecedent policy; but, apart from other complications, the New Haven is forced to consider the effect of higher freight rates on the great factory interests of New England, now meeting intensive competition in the South and West; so the increase in passenger rates, sure to meet public outcry, nevertheless seems to have been along the line of least resistance. The reasoning of the company has probably been based on the theory that the main line traffic—and a few of the subsidiary lines in populous regions—have been carrying the weaker subsidiaries, of which the company has many; that increased fares is a better alternative than decreased service—though the latter may have to come later; and that by a carefully studied readjustment, with slight increases on the main stem and larger increases on the non-profitable subsidiaries, a higher total of gross earnings will be reached. Quite apart from other considerations, the low rates which the corporation has maintained in the past give the company the moral as well as the economic right to try the experiment. Like many other railway companies under the stress of adverse conditions, having their present climax in the demands of organized labor, the New Haven turns in any direction that may afford relief, albeit hypothetical.

Broader aspects of the question naturally suggest themselves. Manifold are the definitions of what constitutes a fair passenger rate with the actual service rendered to the public as its basis. Manifold also are the theories as to the point where the rate establishes greatest profit to the railway; and those theories vary much with local conditions. But it will generally be agreed that no railway should be compelled to maintain an unprofitable rate; and that dictum leads, with some logic, to the further proposition that in general, with due regard to future development of business, a railway has the right to seek the largest profit. The New Haven has tried exceptionally low passenger fares with success. It is now to readjust them upward in the hope of greater success. The returns after the new readjustment, coupled with the results of the readjustment downward four years ago, will be a unique and invaluable contribution to the data of passenger rate-making.

THE MALLET COMPOUND LOCOMOTIVE AND ITS LIMITATIONS.

The Mallet compound locomotives which have appeared in this country during the last few years have by their good performance won many friends. They have been introduced for use in slow, heavy service, and their capacity for doing work in such service and their low coal consumption have proved sufficient to overcome the obvious disadvantages arising from their complicated mechanism. It is not unnatural that their usefulness in the field to which they have been applied should stimulate a desire to widen their range of action; should raise the question as to whether by giving them larger wheels they may not be used effectively in road service upon schedules involving considerable speed. In view of a somewhat prevalent disposition to bring this question forward, it will be of interest to consider the extent of the handicap which must be overcome by the Mallet type when put into fast service.

First of all, its design as a vehicle is not well chosen for work at high speeds. All will not agree to this statement. Mr. Mallet himself will not. But the fact remains that a very heavy leading truck swiveling on a pin behind its rear axle and carrying its load on a transverse shoe along which the load must shift for considerable distances to permit the radial movement of the truck, while satisfactory at low speeds, is likely to be the source of some uncertainty upon rough or crooked track at high speed. The cost of maintaining the system of flexible steam piping and other details of mechanism which reach across from the fixed truck and boiler to the radial truck, will increase as speed is increased. Moreover, these considerations, while important, are entirely secondary to the fact that any results which at speed may be obtained by the use of the Mallet, excepting that of flexibility on tortuous tracks, can better be obtained by a machine of more simple design. It would be possible to design a Shay locomotive for work at speed, but it would not be good engineering; it would not be difficult to design a Mallet locomotive for work at speeds, but such a design would not constitute the adaptation of the simplest means to the desired end. The advantage to be derived from the use of the Mallet type on the main lines of American railways is to be seen in its ability to develop enormous force at the draw-bar, but these forces are possible only at low speeds.

At speed, whatever the type may be, it is the boiler and not the adhesion that limits the output of power. The moment the speed is increased by any considerable amount, high draw-bar forces become impossible and the wheel arrangement peculiar to the Mallet type unnecessary. The assumption even of a moderate speed will permit wheel arrangements, now common, to absorb the full power of the largest boilers now considered practicable. For example, assume that a locomotive is used which is to have sufficient boiler capacity to permit 2,000 h. p. to be developed in compound cylinders at all practicable speeds. Such a locomotive would require a boiler having in the neighborhood of 5,000 ft. of heating surface which, if fired with coal, would need to be supplied with 6,000 or 7,000 lbs. per hour. The draw-bar

force equivalent to 2,000 h. p. for several different speeds is as follows:

At	1	mile	an	hour,	the	tractive	force	will be 750,000 lbs.
"	5	miles	"	"	"	"	"	" 150,000 "
"	7½	"	"	"	"	"	"	" 100,000 "
"	10	"	"	"	"	"	"	" 75,000 "
"	20	"	"	"	"	"	"	" 37,500 "
"	30	"	"	"	"	"	"	" 25,000 "
"	50	"	"	"	"	"	"	" 15,000 "

Assuming the driving axle of the proposed locomotive to carry a load of 50,000 lbs. and assuming the adhesion to be 25 per cent., each driving axle will serve to develop 12,500 lbs. tractive force. A Mallet compound having eight axles would be capable of developing a maximum tractive force of 100,000 lbs., which force is equivalent to the development of 2,000 h. p. in the cylinder at a speed of 7½ miles per hour. At speeds lower than this the adhesion derived from eight axles will not permit the cylinders to develop this rated power, and for speeds higher than this the full adhesion of eight axles will not be necessary to the development of 2,000 h. p. For all speeds above 7½ miles per hour its tractive power must depend upon its boiler capacity, and the possible draw-bar stress steadily declines as the speed increases. At 20 miles an hour it falls to 37,500, a stress which can be taken care of by a Pacific type engine, and at 30 miles an hour it falls to 25,000, a stress which under the assumption may be taken care of by an Atlantic type. At 50 miles an hour this 2,000 h. p. locomotive would exert at the draw-bar but 15,000 pounds, an amount which may easily be handled either by an Atlantic or a Pacific type locomotive. So that while the Mallet would have some advantage in starting, the moment it came to speed it would be performing service which could readily be secured by the use of a much simpler wheel arrangement.

CORROSION OF IRON AND STEEL.

Not long ago we were quite content to ascribe rusting of iron and steel to the presence of moisture, and let it go at that. Now we know only a little more. Of recent years various investigators have attempted to solve the chemistry of the matter and with various resulting theories, dependent, to a great extent, on the mental attitude with which the subject was approached. Whether any or all of them are correct does not seem to be quite proven so that the final Q. E. D. can be written, but it does seem as though the electrolytic theory was gaining ground fastest. While ostensibly discussing corrosion in general, a recently issued book by Alfred Sang is really an advocacy of the electrolytic theory.

When two or more alternatives are presented, most people prefer to take the simpler and more easily understood, on the principle of working along the lines of least resistance. For that reason the plausible carbonic acid theory has received a wide acceptance. It takes but a slight knowledge of chemistry to see how the "carbonic acid may attack the iron, converting it to a carbonate and releasing hydrogen, which unites with the oxygen present, as air or otherwise, to decompose the ferrous carbonate to ferric hydroxide or rust, leaving the same amount of acid as was originally present to react as before and form more rust." The theory is a logical one and is not disproven by the fact that rusting may take place when no carbonic acid is present. For that simply goes to show that, possibly, rusting may take place in two or more ways and from different causes. The same goal may be reached by different chemical routes.

On the other hand, the electrolytic theory presents a tangled mass of reactions, difficult for the layman to understand and so complicated that he is apt to abandon the attempt. It is, nevertheless, the most widely accepted theory at present, that of the peroxide of hydrogen having but a scant following. In brief, the electrolytic theory is based on the fact that "when two substances of different polarity are immersed in a suitable electrolyte, an electric current is set up and the substance from which the current flows tends to dissolve." Hence rusting depends on the presence of impurities in the metal or of a variation in the homogeneity of its structure. Water is the electrolyte and it forms the connection between the impurities and the pure metal. The current thus set up is active in the liberation of hydrogen, due to the solution of the iron.

That impure metals are dissolved or rusted more rapidly than those that are pure is an old story, as it was shown to be the case by Faraday as far back as 1822, but whether an absolutely pure and homogeneous metal would be rustless or not has not yet been proven, because of the non-existence of such a metal. But we do know that the tendency to rust decreases as the purity increases, so that it is at least logical to assume that when the perfect metal is obtained it will be rustless.

Meanwhile in the case of the metals with which we have to deal, it has been proven that hydrogen tends to promote corrosion. In fact, it is flatly claimed that it is essentially a cause of corrosion, though "it may be neither the first nor the whole cause."

So oxygen also appears to be necessary, and in the electrolytic theory it serves to remove the layer of gaseous hydrogen which may accumulate on the surface of the iron. But amid all of these chemical complications we swing back to the same point again and again, where we find the rate of corrosion dependent upon the structure of the material and the mechanical treatment to which it has been subjected. It is a repetition of the old story of homogeneity and purity. For example: "hard cast iron is less corrodible than soft cast iron of a similar composition, and it corrodes faster if cooled irregularly than if cooled uniformly and slowly," due probably to greater homogeneity, because of the greater percentages of combined carbon. "So, too, the more porous the material the more rapidly will corrosion proceed, and blowholes of any size invite rust." Increase of density serves to check the tendency to rust, whereas "carelessness of manufacture which tends to heterogeneousness is an invitation to corrosion and, in itself goes far to explain why modern steel, which is tortured into shape at such a high speed that the molecules are not permitted to readjust themselves, is said to be more corrodible than the metals produced a generation ago, when iron was produced in small quantities and was rolled slowly and allowed to cool naturally."

Then comes the effect of stress. It was shown fifteen or twenty years ago that when metal was subjected to stress it corroded more rapidly than when in normal condition. Whether this is because of an unevenness in the distribution of the stresses or not is not known. But it is at least certain that no stresses to which any mass is subjected can be distributed uniformly throughout it; from which it follows that there must be a variation in the structure, which brings us directly back to the effect of mechanical treatment on corrosion. For the strains thus induced "are really equivalent to straining the metal beyond its elastic limit," which, as we have seen, makes it more corrodible.

Mr. Sang calls attention in a final chapter of his book to the interesting phenomenon presented by the rusting of steel rails. It has been observed, in many instances, that rails in service rust far more slowly than those that are out of service. Galvanic action has been suggested, but it is not at all likely that the foot of the rail would owe its protection to a thin skin of dense and crushed metal in the top of the head." As a matter of consistency that crushed metal by varying the homegeneity of the metal should facilitate and not prevent corrosion, and this may be what it does when the rail is laid aside. The whole array of facts that have been collected seem to indicate that the vibration of the rails in service tends to protect them. No explanation has been vouchsafed, thus far, to explain this remarkable coincidence between use and absence of corrosion. It is simply known that the greater the density of traffic, and consequently the

greater and more frequent the vibration, the less the corrosion.

In default of a better explanation the *Railway Age Gazette* offers this as a tentative one which seems, at least, worthy of consideration.

It is well known that if a permanent steel magnet is struck with a hammer and caused to vibrate it will be injured magnetically and that if the treatment is kept up for a sufficient length of time it will be entirely demagnetized. Again, electric currents in iron and steel are always accompanied by magnetic phenomena, and our whole system of electro-mechanical operations is dependent upon magnetic action. According to the theory of corrosion under consideration, the cause lies in the formation of exceedingly weak electric currents. Now if, by the vibration to which the rails are subjected, the magnetization of their areas may be prevented, is it not reasonable to assume that this resistance to such magnetization which is set up will continue its influence and tend to check or even prevent the formation of the electric current itself, which is the supposed cause of the corrosion and, the cause being removed, the corrosion does not occur.

Non-homogeneity or the presence of impurities, of course, increases the tendency to generate electric curents, and the effect depends, apparently, upon the polarity of the impurity. The nature and the amount, of course, have a marked influence, and this, in turn, depends upon the condition of the mixture. The non-metals, except sulphur, seem to protect; while, in the case of metallic impurities, those which are more corrodible than iron will act unfavorably, while others, which are not so sensitive, will protect the iron with which they are alloyed. Here we have a striking example of the generation of a current between dissimilar metals in contact, which has received its most notable illustration in the thermo-electric pile.

So while no one has yet proven the electrolytic theory of corrosion to be true beyond all dispute, and it is not probable that for a long time it will be so proven, nor are we in any position to claim that it is the only true explanation, data is being accumulated to such an extent that it stands to-day as probably the most plausible explanation that we have and, as such, can be accepted tentatively until something else presents itself that can marshal an equal array of facts to prove the soundness of the hypothesis on which it rests.

NEW BOOKS.

The Corrosion of Iron and Steel. By Alfred Sang. McGraw-Hill Book Co., New York. 141 pages; 7½ in. x 5 in.; cloth. Price, $1.00.

The book opens with a plain statement of the composition of rust and the phenomena that accompany its formation. It then takes up the three main theories in explanation of that formation. The carbonic acid theory is stated fully and concisely, and the arguments in its favor are given in a manner to convey the idea that it cannot be discarded without better reasons being brought up against it than have yet appeared. The peroxide of hydrogen theory is dismissed after a short description. Then follows the real gist of the book, which is an elaborate discussion and exposition of the electrolytic theory. Chapter follows chapter showing how the phenomena of corrosion as manifested in the air, in water, in acid and under all conceivable conditions point to this theory as the most plausible explanation. This theory is treated more at length editorially in this issue. At the end of the book there are three sections that add greatly to its value. One is a list of references or authorities for the statements made in the text; the second is a valuable bibliography, and the third is a very complete index of contents. To those interested in the study of rust and rust prevention, the book cannot fail to be of great assistance, inasmuch as it is a brief but thorough digest of observation and existing data on the subject.

Contributed Papers.

WESTERN PACIFIC YARDS AND TERMINALS.

BY GUSTAVE E. LEMMERICH,
Formerly Engineer of Shops and Yards, Western Pacific.

In designing the yards and terminals for the Western Pacific a traffic tonnage statement was prepared as a basis, and in this work the available local statistics and annual reports of the Southern Pacific were freely used. From this

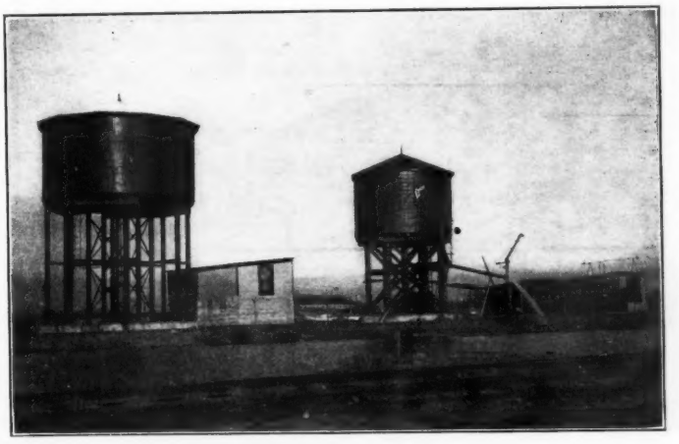


Fig. 1—Water Station.

study of traffic, together with estimates of probable annual increases in the territory to be served, the tonnage was classified under three heads:

1st. Tonnage in competition with the Southern Pacific and the Santa Fe.

2d. Non-competitive tonnage, or that strictly within the territory controlled by the Western Pacific.

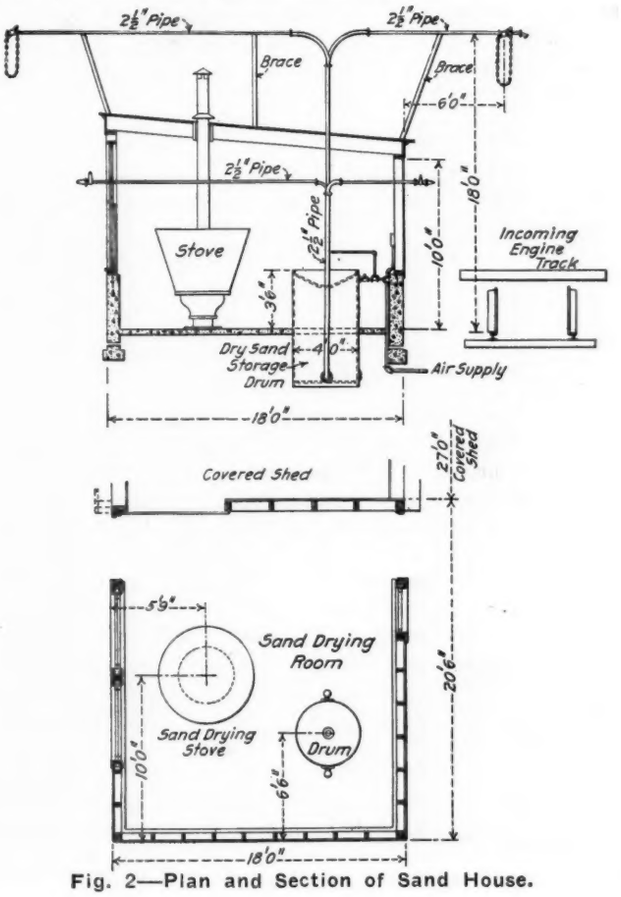


Fig. 2—Plan and Section of Sand House.

3d. Railway company freight.

Diagrams were prepared of the east and west bound movements showing probable amount of each class of tonnage and possible train movements in each division; these studies and diagrams, however, being matters the company does not make public.

For the general handling of operation and selection of economical operating divisions, computations of train mile costs were prepared, using as a basis the figures of Mr.

Fig. 3—Mill and Freight Car Shed at Oakland.

Berry for the average cost per train mile on the Union Pacific for 1902, as follows:

Maintenance of way and structures		$0.23
Maintenance of equipment		.25
Conducting transportation:		
Fuel	$0.13	
Balance	.45	
		.58
Taxes and general expenses		.11
Total		$1.17

The foregoing figures were adopted with the exception of fuel, this item being governed by: (a) delivery cost at respective division terminals, (b) ruling grades, (c) tonnage, and (d) type of engine. The fuel is coal between Salt Lake City and Winnemucca and oil from Winnemucca west.

A low contract for oil at 55 cents per barrel, delivered at Stockton, Cal., was in force at the time the calculations were made; 162 gallons of oil, weighing approximately two-thirds of a ton, being equivalent to one ton of coal. The freight to Oroville on a comparatively level grade was figured at 0.40 cents per ton mile for loaded oil cars and at 0.25 cents for empty returns. This made the cost of oil fuel per ton at Oroville, the division point, $2.75, as per following items:

Cost of oil	$2.12
Freight	.50
Miscellaneous	.13
Total	$2.75

The additional haul to the intermediate fuel stations on the 1 per cent. grade increased the cost per ton to $2.99

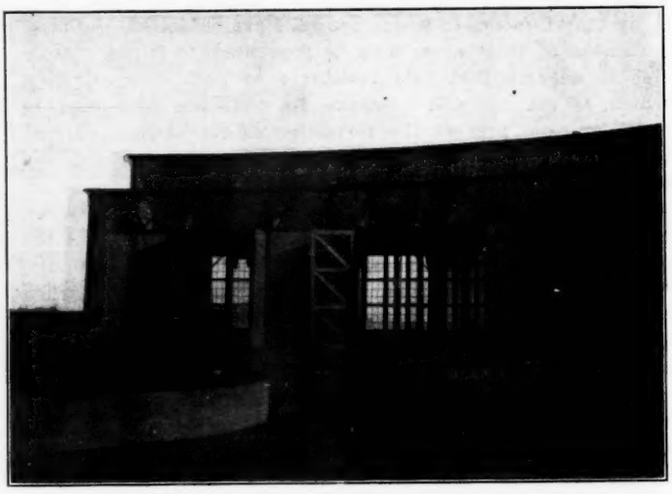


Fig. 5—Front View of Roundhouse at Oakland.

and $3.49, respectively. Freight is handled by a consolidation engine, 2-8-0, with 22-in. cylinder, 30-in. stroke, with driving wheels 57 in. diameter. Steam pressure, 200 lbs.; weight on drivers, 185,000 lbs.; weight of engine, 207,000 lbs.; weight of tender, loaded, 160,000 lbs.; total weight of engine, with tender, 367,000 lbs.

The division from Oroville to Portola has 20 miles of 0.4

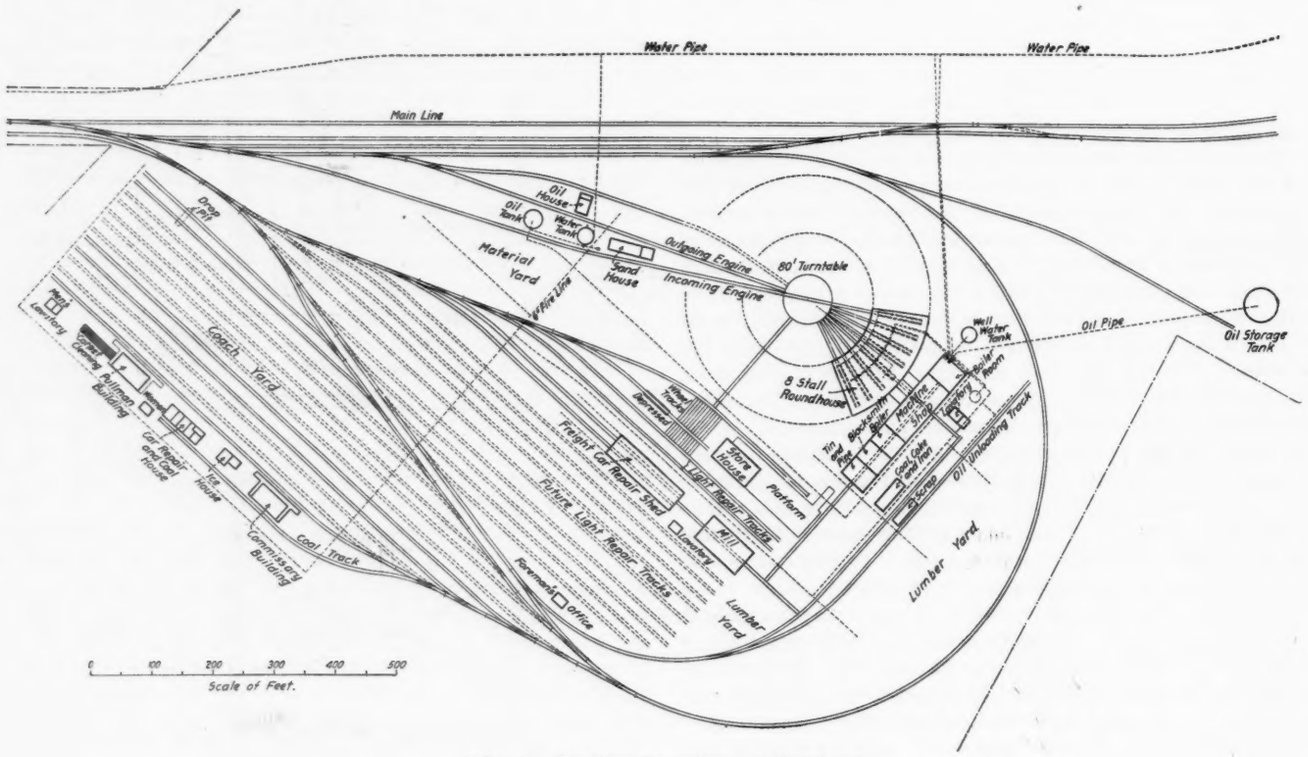


Fig. 4—Engine Terminal at Oakland.

per cent. and 100 miles of 1 per cent. grade, and for this division the following fuel costs were obtained:

1. For a train of 1,000 tons, exclusive of engine:

Movement at 21 miles per hour, 0.4 per cent grade	$0.31
Movement at 14 miles per hour, 1 per cent. grade	1.00

2. For a train of 1,500 tons, exclusive of engines, with helper service:

Movement at 18 miles per hour, 0.4 per cent. grade	$0.58
Movement at 15 miles per hour, 1 per cent. grade	.87
Helper engines on 1 per cent. grade	.87

Using the local fuel costs in the statistics of Mr. Berry, in

Fig. 6—Rear View of Roundhouse at Oakland.

place of his fuel costs, the costs per train mile were found to be as follows:

3. Train of 1,000 tons, exclusive of engine, on the 0.4 per cent. grade:

Berry's figures, exclusive of fuel	$1.04
Fuel	.31
Add for local conditions	.10
Total	$1.45
On the 1 per cent. grade	$1.04
Fuel	1.00
Add for local conditions	.21
Total	$2.25

4. Train of 1,500 tons exclusive of engines:

On the 0.4 per cent grade	$1.04
Fuel	.58
Add for local conditions	.13
Total	$1.75
On the 1 per cent. grade	$1.04
Fuel	.87
Add for local conditions	.27
Total	$2.18
Helper engines—Berry's cost, exclusive of fuel	$0.30
Fuel	.87
Add for local conditions	.03
Total	$1.20

Helper engines return light at 36 cts. per mile.

The computations based on assumed traffic for the Oroville-Portola division showed that a single train of about 30 cars will be more economical to handle than one of 40 to 45 cars with helper service, the efficiency of the two engines coupled being only about 85 per cent. An engine of the Mallet type is suggested as best for this division owing to the presence of reverse curves and numerous short tangents, with a train of about 40 cars, as being most economical and efficient.

For the first division point west of Salt Lake City, Wendover was selected, making this division 120 miles long. Water had to be carried to Wendover, a long distance and at a great expense, the place being on the edge of Great Salt Lake and having no water. It is also at the foot of a 1 per cent. grade of 33 miles. Shafter, at a distance of 160 miles from Great Salt Lake City, was considered also. It has a good water supply and the surroundings are good, so it was superior to Wendover as a living point. It is also well situated as a traffic point, the Nevada Northern having good prospects for a large tonnage both ways and a good future for extensions, probably to southern California. In selecting Shafter for the division point, tonnage would be sacrificed for speed to avoid large overtime charges and the 100 miles of nearly level track would not be utilized for tonnage. It was estimated that an annual saving of practically $100,000, basing the estimates on only a fair tonnage, would be saved by selecting Wendover rather than Shafter for a division point.

The general plans contemplate lap sidings as the preferable type, but for present needs only one siding was put in. Up grade trains are given the preference wherever practicable in the 1 per cent. grade. At some stations a short track was provided for placing bad order cars, etc.

In Fig. 1 a water station is shown. Water columns are used in preference to tanks placed at the track, the latter obstructing the view to the depot and increasing the cost of track maintenance at the tank. The water columns were placed at least 100 ft. from clearance point, that the siding may not be blocked. They are located for one stop at the depot and for taking water at the same time. On 1 per cent. grades water stations were placed, when practicable, at liberal distances apart to avoid bunching traffic at these stations.

The general layout for division terminals is the same, but a standard arrangement could not be strictly adhered to, for local conditions varied. Each point was made the subject of a special study and as some are in mountainous country the influence of topography is noticeable. At Oroville the old gold workings governed the layout and at Portola the mountains and the river were considerable factors. Winnemucca, Nev., is the dividing terminal between the oil burning and coal burning locomotives. This terminal is shown in Fig. 12, and the river influenced the location. A unique engine terminal is that at Oakland, Cal., shown in Fig. 4, with the balloon track for turning overland trains. The terminal property had its limits for development and is also located between two grade crossings with the Southern Pacific. The crossing nearest the mole had originally 13 tracks, later reduced to 5, and this crossing made necessary a stub track switch for the light repair yard. The suitability of this site for a location,

Fig. 7—Interior of Roundhouse.

in the future, of a marine repair yard was considered in the layout. It was also assumed that the engine terminal buildings at this point may be only temporary.

The engine terminals are in general of a standard design; all tracks leading to the turntable line up with tracks in the roundhouse. The turntable is 80 ft. in diameter, operated by a Tatlow motor. Terminal coaling stations consist of an incline with coal trestle for storage and four 15-ton capacity Williams-White movable coal pockets. A locomotive crane is used to fill the coal pockets and chutes deliver the coal to the locomotives. This arrangement provides large coal storage at low cost and is economical for comparatively small terminals. A locomotive crane is assigned to each terminal to handle the coal and is useful for handling other material. An ashpit of the Erie type was selected in order to keep the locomotive crane busy.

The buildings are of uniform design, as shown in Figs. 3, 5, 6 and 7. Heavy timber construction, practically of mill type, was used throughout with the walls up to the window sills built of concrete, except at Oakland. The rear walls of all roundhouses have a wooden panel back of each pit, for about 15 ft., instead of concrete, so that runaway engines may cause a minimum amount of damage.

All the buildings were built by the company forces under

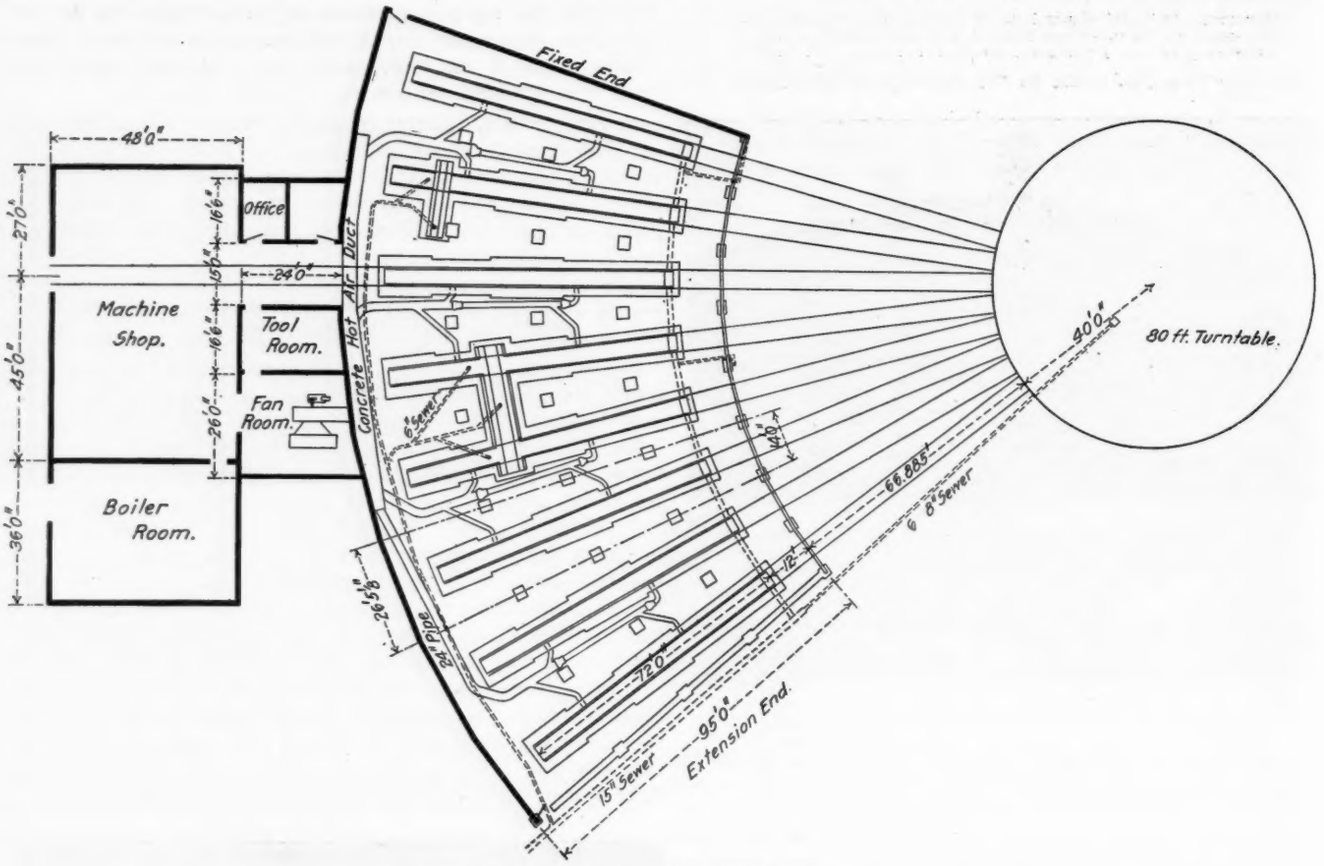


Fig. 8—Plan of Roundhouse.

Single truck pits and double wheel drop pits.

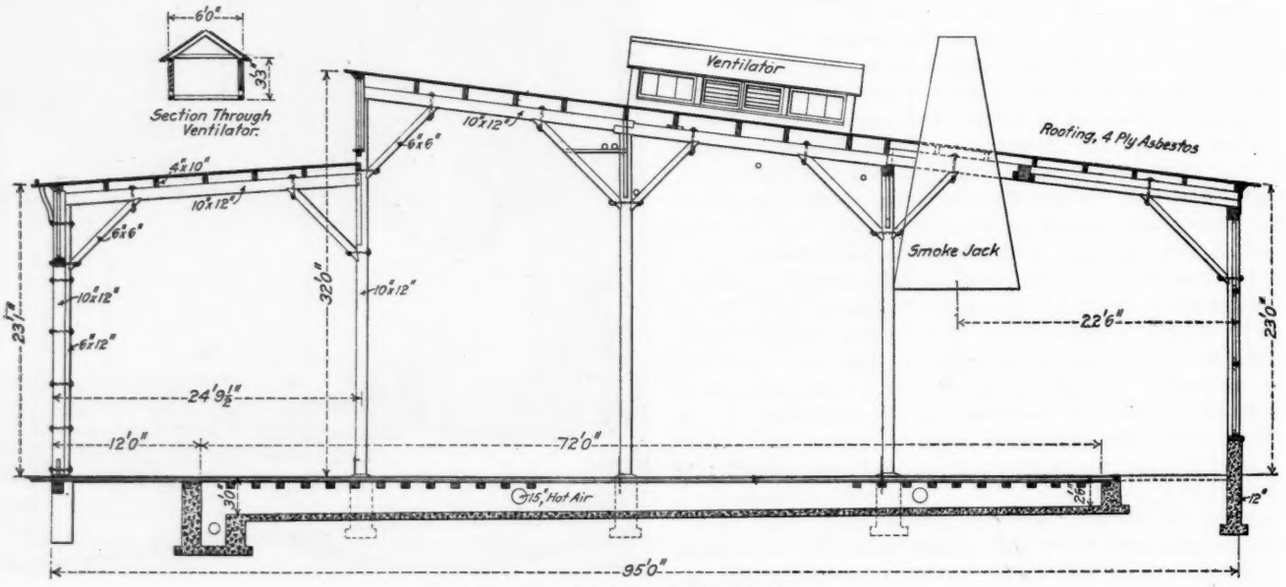


Fig. 9—Section of Roundhouse.

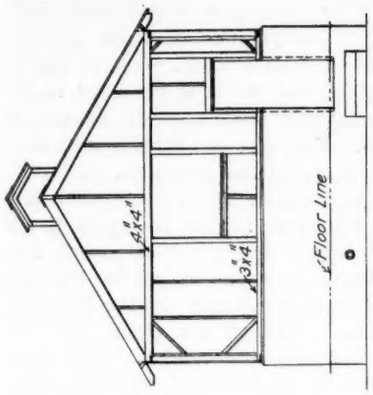


Fig. 11—Longitudinal and Cross Section of Frame; Lavatory Building.

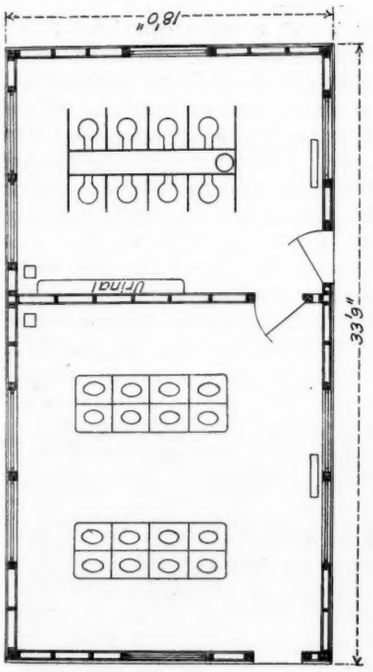


Fig. 10—Plan of Lavatory Building.

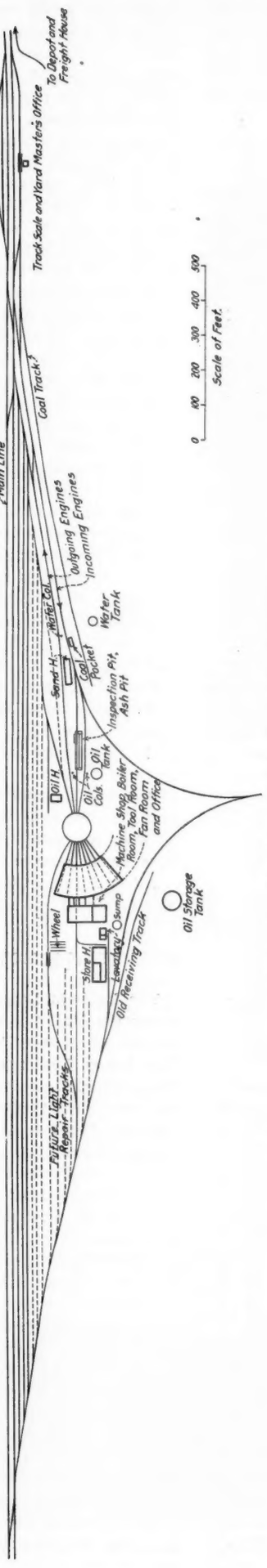


Fig. 12—Division Terminal at Winnemucca.

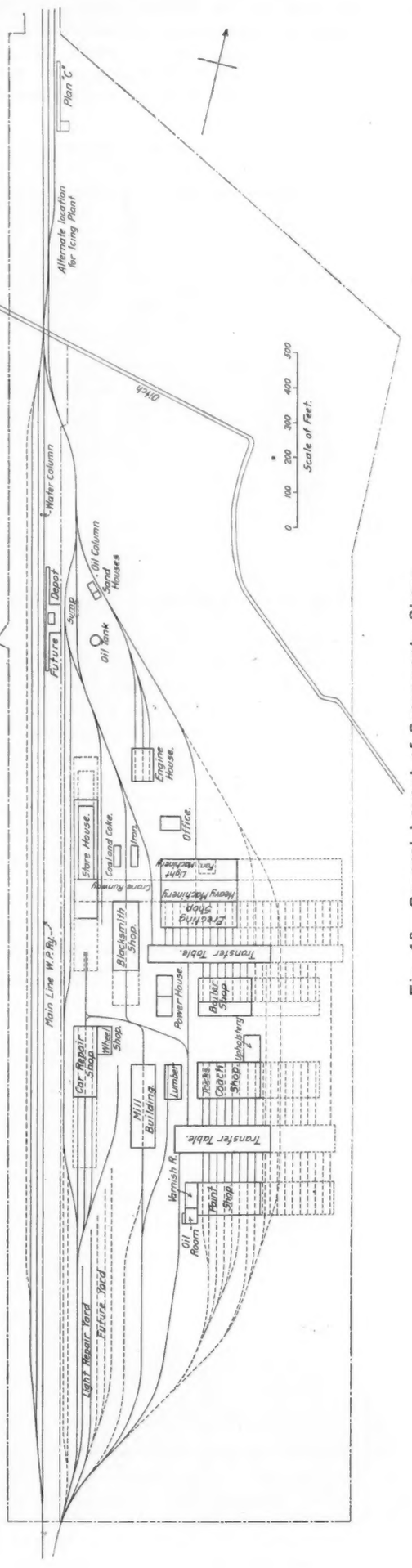


Fig. 13—General Layout of Sacramento Shops.

the supervision of the division engineers. They are well lighted and, for the purposes for which they are intended, are low cost structures. To save freight and permit of easy framing most of the lumber was surfaced on four sides. The roof boards were 2 in. x 8 in., dressed and matched, the

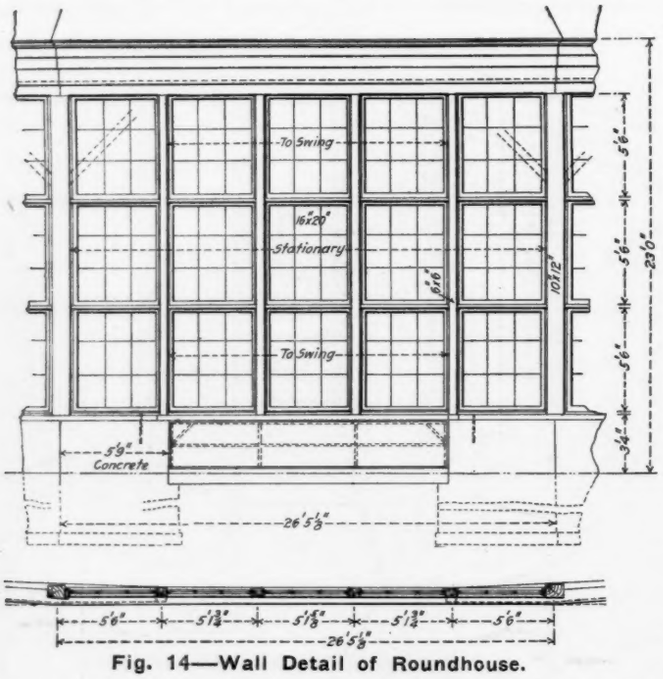


Fig. 14—Wall Detail of Roundhouse.

purlin spacing being arranged to provide for the use of boards of standard length, thus reducing waste and economizing on labor. All exposed interior woodwork, except millwork, above a certain height was painted with Asbestine water paint ap-

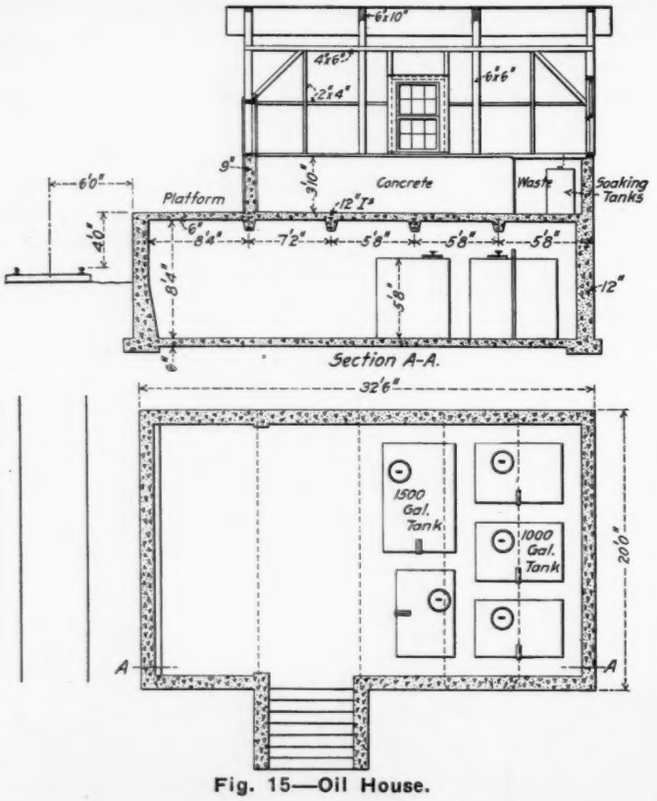


Fig. 15—Oil House.

plied with a brush and thus made practically fire-proof. Plain sash were used for the windows, doing away with box frames, fillers, trim and sash weights. Six and nine lights of 16-in. x 20-in. panes of double strength glass were used. The window sashes were arranged in multiples, stationary and swung and set between heavy studding. The swing sashes are group operated by Drouvé sash operating device.

The roundhouse, Figs. 8, 9 and 14, is 95 ft. deep. A section similar to that used by the Chicago & North Western Railway was used, owing to the fact that there is no snow in California, except in the Sierras; very little snow in Nevada, and the rainy season is short. The Western Pacific roundhouse however, is considerably higher and has good light and ventilation. The pits, smoke jacks and ventilators are similar to the Erie, 1905, roundhouse, described in the *Railroad Gazette*, June 15, 1906. The roundhouse floors are of gravel either oiled or grouted with cement mortar. Except in the warm region of California the houses are heated by the Sturtevant fan system with underground conduits and pipes.

A covered passageway connects the machine shop to the roundhouse, the offices being on one side and tool room on the other side. The fan room is back of the tool room, the arrangement being shown in Fig. 8. The machine shops at present have only a few tools for the running repairs. Only one boiler is at present installed in each boiler room, but room is provided for two boilers. All the pumps, including the fire pump, are placed in the boiler room. The Bowser oil system was adopted and the oil houses designed accordingly. A typical oil house is shown in plan and cross-section in Fig. 15, the excavation being extended under the platform to provide future increased storage. All floors and the walls up to the window sills are of concrete, the remainder of the structure being of wood. The store house is small but well lighted. The lavatory building, equipped with modern sanitary shop plumbing, is shown in Figs. 10 and 11. The sand house, Fig. 2, has air equipment for delivery of sand, and in general is similar to such buildings at small terminals. All terminals are provided with fire protection apparatus.

The main shops have not yet been built, but a study for the general layout is shown in Fig. 13. The main feature in this is the crane runway in the heavy machine section of the locomotive shop. This runway is extended both ways outside of the building and connects the store house, blacksmith shop and material yard with the main shop. If some other shape of property could have been obtained, this crane runway feature would have been used still more in the layout.

All designs and plans, etc., were submitted to V. G. Bogue, vice-president and chief engineer, for his approval.

MALLET LOCOMOTIVES FOR THE SOUTHERN PACIFIC.

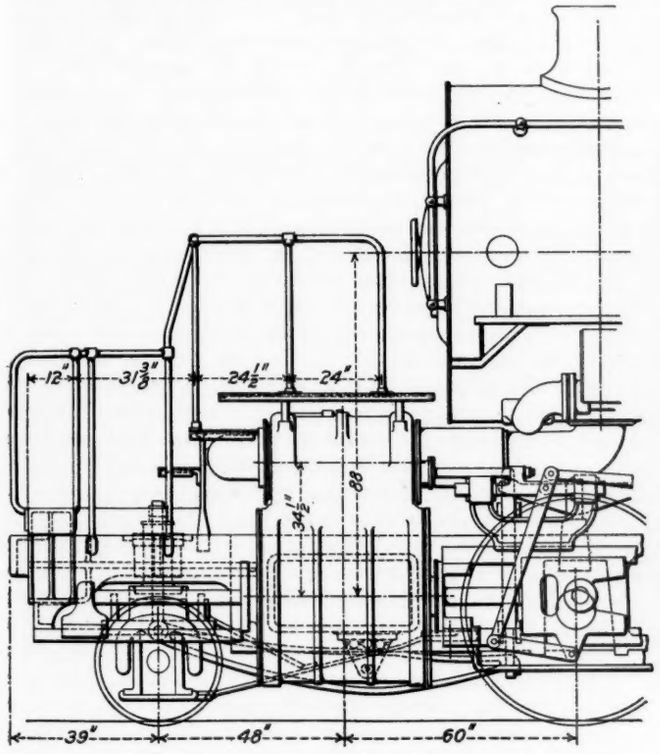
The Baldwin Locomotive Works recently completed 21 consolidation Mallet locomotives for the Harriman Lines. These are part of an order for 105 engines placed in the spring of 1909. The heavy Mallet engines have been assigned as follows: Three coal burners for the Union Pacific, three for the Oregon Railroad & Navigation Co., and 15 oil burners for the Southern Pacific. Apart from modifications necessary because of the change of fuel, the six coal burners are practically duplicates of Southern Pacific locomotives Nos. 4000 and 4001, which were built by the Baldwin Locomotive Works early in 1909, and illustrated in the *Railroad Age Gazette* of April 30, 1909. Experience gained in operating these engines through tunnels and snow-sheds has proved the desirability of placing the engine crew where a better view of the track can be obtained. Accordingly, the new Southern Pacific locomotves are designed to run with the fire-box end first, and the tender back of the smoke box. With a coal burning locomotive such a plan would, of course, be impracticable, but no difficulty need be anticipated when using oil as fuel.

In the new design the cab is entered through side doorways, reached by suitable ladders. An unobstructed view of the track is obtained through the front windows. The cab fittings are conveniently located within easy reach of the engineman, who occupies the right-hand side when looking ahead. The Ragonnet power gear is employed, and its cylinder is located as on the previous locomotives. It has, therefore, been necessary to run a shaft across the boiler back-head in order to

make connection with the operating lever. This arrangement, however, in no way interferes with the convenience of the cab fittings.

The main frames are securely braced under the cab by a steel casting, to which the bumper is bolted. The latter supports a stub pilot. The bumper is placed well forward to protect the occupants of the cab from buffing and collision shocks.

The deck-plate at the smoke-box end of the locomotive is of cast steel, and is provided with a chafing block and a suitable



Arrangement Between Engine and Tender; Southern Pacific Mallet.

pocket for the tender draw-bar. The tender is of the Harriman Lines standard design with rectangular tank, as equipped for oil-burning locomotives.

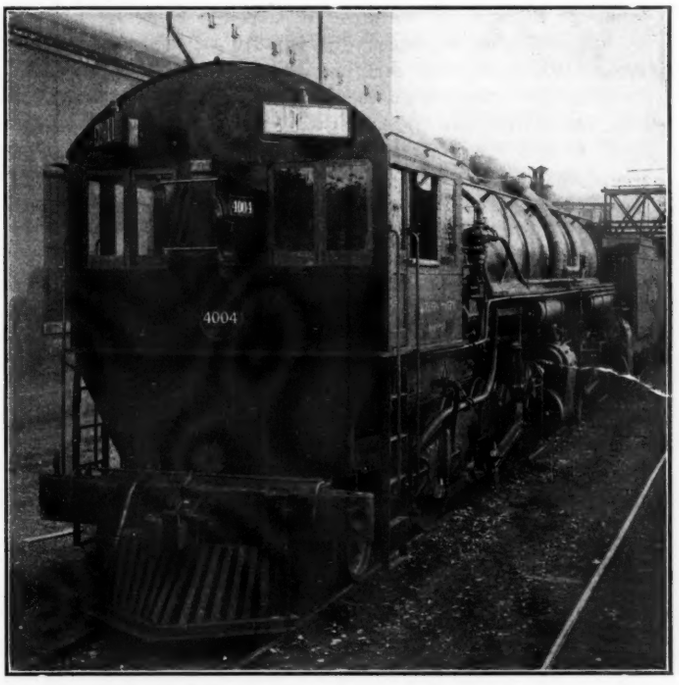
As far as the boiler, cylinders, machinery and running gear of this locomotive are concerned the design is the same as that of Southern Pacific engine No. 4000. The latter engine has now been in service a sufficient length of time to demonstrate its value; and the fact that 21 additional locomotives of the same type have been built for the Harriman Lines shows that the performance of these great engines has been fully up to expectations.

The following are those of the principal dimensions of these engines which differ from the engines described in the *Railroad Age Gazette* of April 30, 1909:

Weight on drivers	394,700 lbs.
" " front truck	22,100 "
" " rear truck	20,200 "
Weight, total engine	437,000 lbs.
" engine and tender	610,000 "
Tank capacity fuel	3,150 gals.
Tractive effort	89,425 lbs.

$$\frac{\text{Weight on drivers}}{\text{Tractive effort}} = 4.41$$

$$\frac{\text{Total weight}}{\text{Tractive effort}} = 4.88$$



Front End of Southern Pacific Mallet.

$$\frac{\text{Tractive effort x diameter drivers}}{\text{Total heating surface}} = 797$$

$$\frac{\text{Weight on drivers}}{\text{Total heating surface}} = 61.58$$

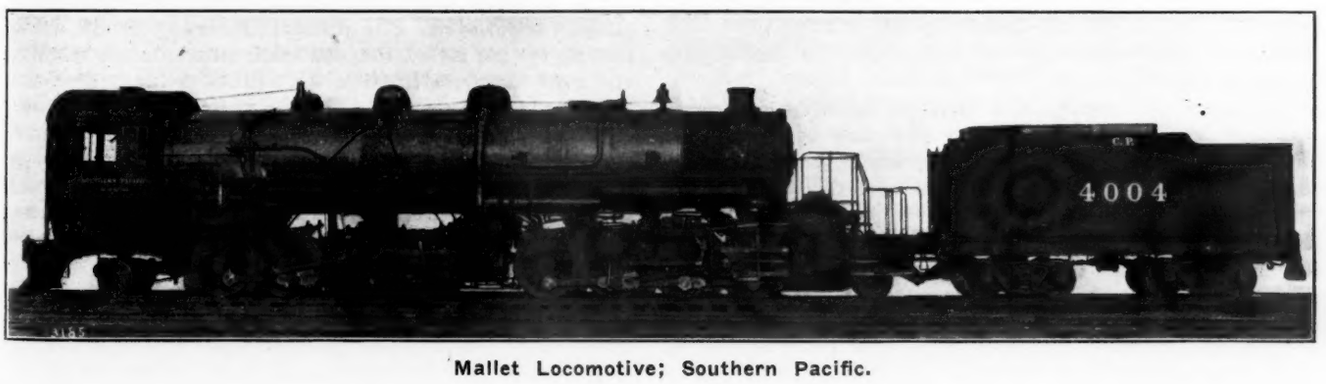
$$\frac{\text{Total weight}}{\text{Total heating surface}} = 68.35$$

STRESSES DEVELOPED BY COLLISIONS OF FREIGHT CARS.*

BY COL. B. W. DUNN.

It is comparatively easy to deal with static stresses and to provide adequate resistance for them. We can duplicate them and keep them in action and under observation as long as may be necessary to check the accuracy of our conclusions. This is not true of stresses due to impact. Their duration is too short to permit measuring their varying intensities by static testing machines. The fundamental relations between velocity,

*From a paper read before the New York Railroad Club.

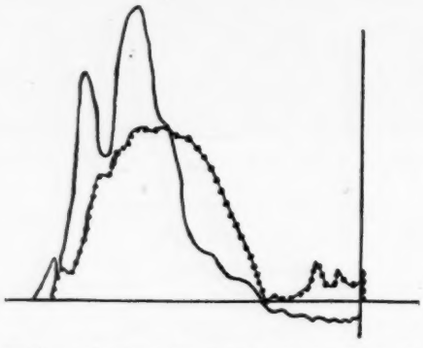


Mallet Locomotive; Southern Pacific.

momentum, path, intensity and work, are simple and well established, but it is difficult to secure an accurate time record of the path traversed by a moving body under the retarding or accelerating action of an unknown force. Without this record we cannot measure the varying intensity of the force, and without this intensity we cannot provide intelligently and accurately the resistances needed to protect our material from injury.

We do know from observation, that the destructive effects of car collisions increase very rapidly with speed and that the rules for coupling cars have been framed with a view to keeping this speed down to the lowest practicable limit. We also know that our train crews exceed more frequently than they observe the limit generally prescribed, of two miles per hour; that if they did observe strictly this limit, their work would be delayed in classification yards; that the automatic couplers and the "humps" are modern necessities and furnish an apparently unavoidable combination, tending, in a busy yard, to cause violations of the coupling speed rule.

Many yardmasters are prone to consider as permissible any coupling speed that does not cause a visible injury to the car, and the modern car will stand impacts that wrecked older models. Freight claim agents and auditors know that while the car has been strengthened, little has been done to protect its lading against these increasingly severe coupling shocks. Unless packages are ruptured and their contents visibly leaking or escaping, the sealed cars will go on to their destination



Enlarged Superimposed Gage Record.

Test No. 301. *Cards No.* 10. *Both Cards taken at same time. Springs,* 80 *lbs. per sq. in. Velocity,* 5.1 *m. p. h.*

and no subsequent tracer of the car's movement has yet been able to develop an acknowledgment of "rough treatment."

Leakage of an inflammable or explosive substance from its shipping container is a preliminary and a long step toward fire or explosion; and it has been the aim of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles to discover the real causes of the disasters it seeks to prevent. This policy led the chief inspector more than two years since to ask the assistance of the Pennsylvania Railroad in an experimental investigation of the probable effect of coupling shocks on packages of explosives in cars. Before describing and commenting on this investigation, it will be interesting to discuss car impacts briefly from a theoretical standpoint to refresh our minds on the fundamental principles involved.

To change the velocity of a body we must apply a force and the product of this force by the path over which it operates gives us the work accomplished. If the force is variable we must obtain this product by integration. When two modern cars collide, the variable resistance of the friction draft gear is first brought into play. The total path for the two gears in contact is about 4.8 ins. If this gear acts in service, and under shock, exactly as it does under laboratory testing conditions the diagram published in the pamphlets describing these gears will tell us the total force exerted on each car at each point in this path. The area under the curve, limited by any two values of the force, is the integral that represents the work accomplished.

An algebraic expression for this work, W, is

$$W = \frac{w\,(V^2 - v^2)}{2\,g}$$ in which

w is the weight of the car, g the acceleration due to gravity, V and v the velocities of the car corresponding to the two points considered. Assuming a solid bumping block to which a draft gear is attached, the total work corresponding to complete compression of the gears under laboratory conditions is about 36,000 ft. lbs. If the work is just able to stop a car weighing 150,000 lbs., we find by solution of (1) for V, ($v = o$), $V = 3.93$ ft. per second $= 2.68$ miles per hour. It appears therefore, that our rule limiting the coupling speed to two miles per hour does not provide any excessive factor of safety.

When our assumed car has more energy than can be absorbed by the friction draft gear, the excess must be dissipated by elastic or permanent deformation of the car itself. The path available for elastic movement is very limited, and the force must be correspondingly high to absorb an appreciable amount of energy. If our assumed car has, for example, a speed of 5 miles per hour, it will still be moving at a speed of 2.88 miles per hour, or 4.23 ft. per second, and its kinetic energy will be 90,300 ft. lbs., when the friction draft gears are solid. Even if we could assume a harmless elastic compression of the car frame of 1 in., the average force required to absorb this energy over this path would be 1,083,600 lbs., or about 7.2 lbs. per lb. of weight of car and lading. The maximum force would be about twice the average, or 14.4 lbs. per lb. of weight. If the elastic compression should be limited to ½ in., instead of 1 in., these values would be doubled.

Any movement of the lading permitted along the floor of the car would tend to prevent the application of these high pressures to the lading, but cases may well occur in which the advantage of this movement is apparent only. A 1,000-lb. package, for example, rigidly attached to the car, moving at a speed of 5 miles per hour, would receive a maximum pressure of, say, $1000 \times 14.4 = 14{,}400$ lbs. If it is free to slide along the floor, the force of friction (assuming co-efficient of friction $= 0.4$) would be about 400 lbs. and the energy of the package would be absorbed by a sliding of 2.1 ft. So far, the advantage of permitting it to slide is pronounced, the maximum force being reduced from 14,400 lbs. to 400 lbs. Suppose, however, that after sliding 1 ft. it comes into contact with a solid part of the car and that while the package is sliding this distance of 1 ft. the car has moved over its permitted path of 4.8 ins., and has not only been brought to rest but has acquired some velocity of rebound. The package, with a remaining relative velocity of at least 5.31 ft. per second, will then collide with a solid obstruction in the car. It will receive a maximum pressure per lb. of its weight much greater, probably, than it would have received if it had been rigidly attached to the car and the chances in favor of crushing it will be correspondingly increased.

The necessity for a thorough investigation of car impact stresses is apparent. The ordinary slidometer results are misleading for the reason that the sliding mass in the testing instrument is not restricted to the path of the car. The energy of this sliding mass at the instant of impact can be obtained from the slidometer record together with the maximum force (compression of slidometer spring) required to stop it. The maximum force applied to the car, and to its rigidly attached lading, especially after solidification of friction draft gears, is not measured; and this, unfortunately, is the force that is responsible for the damage we would like to avoid.

DYNAMIC MEASURES OF IMPACT STRESSES.

An accurate time-space record of the motion of the car after impact would enable us to calculate the force developed at any instant. This record can be obtained best by the trace

of a tuning fork. The fork could be attached to the car and made to trace its record on a stationary surface, or the surface could be attached to the car while the fork is stationary. Another method, and probably the most convenient one, would be to mount both the surface and the fork in the car, one rigidly attached to the car and the other free to continue its unretarded motion for a sufficient distance. The maximum of accuracy in tests of this nature results from the use of photography to record the trace of a fork of high frequency on the sensitized surface of a cylinder revolving uniformly and independently.

Assuming that an accurate time-space record for the car has been obtained, it will furnish, or enable us to construct to a suitable scale, a curve, whose ordinates represent compressions of the draft gear, or motion of the car after impact, and whose abscissas represent time of duration of this motion. The successive differences of ordinates separated by small and equal intervals of time, divided by the time interval, give us the successive velocities of the car and enable us to construct a second curve to show this velocity as a function of time. The first differences of ordinates of the velocity curve divided by the uniform time interval give us the successive decelerations of the car, and the product of these by the mass of the car and its lading give us the force exerted at any instant to stop the car. The method described amounts to a graphical differentiation of the time-space curve and is necessary, since the equation of this curve is not known.

TESTS AT ALTOONA.

To have investigated this problem by the scientifically accurate method described above would have cost more than was thought advisable for a preliminary investigation. The officials of the Pennsylvania Railroad very kindly offered to assist the Bureau of Explosives with any testing facilities available at Altoona and to construct any simple apparatus that could be devised for the purpose. Under the supervision of E. D. Nelson, engineer of tests, A. H. Elliott was placed in direct charge and these gentlemen consulted the writer from time to time.

Apparatus No. 1.—A strong cylinder, 14¾ in. long inside, and 14 in. inside diameter, was bolted securely to the steel underframe of Pennsylvania Railroad box car 18,079, whose weight empty was 45,300 lbs. One end of the horizontal cylinder was closed by a steel diaphragm 0.03 thick and through the rigid end a hole was threaded so that a plug could be inserted with a water tight joint to vary the interior volume of the cylinder. A steam indicator gage with a carefully calibrated spring was connected at the top and the cylinder filled with water. By forcing in the screw plug water was displaced and a slight outward deflection of the diaphragm produced. A solid metal cylinder 5 in. in diameter and weighing 100 lbs. was suspended by chains from the ridge pole of the car and its face adjusted to bear lightly against the center of the diaphragm. On impact, this weight was retarded by pressure from the confined liquid and the gage was relied on to register this pressure. The mass producing the pressure was the 100 lb. weight plus the small weight of a column of water of diameter equal to the gage piston and of length equal to the distance from the diaphragm to the piston. To calibrate this apparatus, the cylinder was mounted vertically and the gage readings noted for various weights resting on the diaphragm. The calibration curve was found to be a right line.

The essential point in any such apparatus is to restrict the test weight as rigidly as possible to the path of the car during the work of absorbing their respective energies. In theory, the only increase in path for the weight in this case was that due to the slight escape of water from the cylinder, to follow the movement of the gage piston, and this corresponded to only about one thousandth of an inch inward deflection of the diaphragm. Means were provided to rotate the gage cylinder to make the record of pressure a curve, but the amount of this rotation did not represent the path of the car after impact. It did furnish the basis for a rough measure of the duration of impact, since the rotation was due to the otherwise free motion of a pendulum weight having the velocity of the car at impact. When the impact speed was about five miles per hour the maximum pressure due to impact was produced in less than one hundredth of a second.

Apparatus No. 2.—A strong 3-in. pipe about 30 ft. long, completely filled with water after excluding all air, was bolted securely to the steel underframe of the car with an indicator gage attached to the impact end. The testing mass in this case was that of a column of water with inside length of pipe to gage connection and diameter of the gage piston, weight about 6¾ lbs. Its increase of path over that of the car was due solely to the change in length of the 3-in. column of water corresponding to the small movement of the piston.

Apparatus No. 3.—A small metal cylinder weighing 6¾ lbs., the weight of the active column of water in the second apparatus, was flexibly mounted in a horizontal position with one face in light contact with a steam indicator gage piston. This amounted, practically, to the ordinary slidometer arrangement and was subject to the objection that the testing weight still had only a partially compressed spring opposing its motion when the friction draft gears were solid. For this reason we should expect its recorded maximum pressures to be less than those given by the hydraulic apparatus and the difference to increase with the speed at impact.

The speeds at impact were obtained by allowing the test car to run down a grade under gravity and they were measured in miles per hour by a reliable electrical apparatus constructed for the purpose. For tests with apparatus No. 1, the moving car was allowed to collide with a draft of from seven to 11 empty steel cars with their hand and air brakes set. For tests with the other forms of apparatus, from four to six loaded cars were used. These cars weighed 39,100 lbs. empty, and about 150,000 lbs. each when loaded with coal.

It is unfortunate that accurate observations were not made on the movements of these cars and of their draft gears as a result of the impacts. If further tests are made, and it is important that they should be made, a solid bumping block should be used first that would restrict the path positively to compression of one pair of gears, and the effect of passing from this to various service conditions should then be determined. The substitution of a draft of loaded for a draft of empty cars increased very materially the severity of the conditions in these tests.

RESULTS OF TESTS.

The first important fact noted was that the gage records showed several alternations of pressure due apparently to wave motions in the liquid. The first pronounced maximum in the curve was accepted as the maximum pressure, although in some cases subsequent registrations were higher. Efforts were made to remove, or reduce, these alternations of pressure by using Apparatus No. 1 without the suspended 100-lb. weight and depending entirely on the mass of the liquid to affect the gage. The flexible diaphragm was also replaced by a solid head for the cylinder and, in another plan, cotton waste was packed into the cylinder with the water for the same purpose. The gage continued to show alternations of pressure, and it is now thought possible that this was due to the successively developed resistances of individual cars in the draft and that accurate observations would have shown small movements of these cars.

The gage pressures recorded were divided by the weights whose decelerations caused the pressures and the results, pounds of pressure per pound of weight, were plotted as a function of the speed at impact in miles per hour. An enlarged superimposed gage record is shown in the accompanying illustration. From the average curves constructed in this way the following table was prepared. It includes data for the three forms of testing apparatus described and for Ap-

paratus No. 3 when the draft gears were blocked to prevent their normal operation in cushioning the blow.

Table of Condensed Results.

Speed of car at impact, miles per hr.	Maximum pounds of pressure per pound of weight—Draft of empty cars. Apparatus No. 1. Draft gears, normal.	Draft of loaded cars. Apparatus No. 2. Draft gears, normal.	Apparatus No. 3. Draft gears, normal.	Apparatus No. 3. Draft gears, blocked.
2	1.6	2.8	2.3	7.0
3	2.8	4.6	3.6	11.4
4	4.1	7.0	5.0	18.0
5	5.8	10.6	6.6	...
6	7.9	18.0	8.5	...

The values in the above table are approximations only, even for the apparatus designated and for the special conditions applying to each test. We know that any change in the path over which the work of stopping the car is done will affect materially the maximum pressures applied to the car and to its lading.

The weakest point, under buffing shock, of the car used in these tests is believed to be the draft stops which are riveted to the center sills with nine ⅞-in. rivets each, driven into $1\frac{5}{16}$-in. holes. Assuming an ultimate strength of 50,000 lbs. per square inch for these rivets, the draft stop ought to give way under a pressure of about 621,000 lbs. As the car with its testing apparatus weighed about 46,000 lbs., this corresponds to a pressure of about 13.5 lbs. per pound of weight of car. In two of the tests higher pressures (18) were recorded without apparent injury to these stops, but it must be remembered that these pressures were of short duration and that elastic movements of the car body tend to reduce the total pressures on these rivets without reducing the pressure on lading rigidly attached to the floor.

It must be admitted, however, that under another general check the results in the above table seem to be too high. If the friction draft gears acted normally, the energy absorbed by one pair, 36,000 foot lbs., corresponded to a speed of 4.9 miles per hour in the test car weighing about 46,000 lbs. The highest pressure would be caused by restricting the path to the actual compression of these two gears, 4.8 in., and the mean pressure, 90,700, is given by dividing the energy by this path expressed in feet. The maximum ought not to exceed twice the mean pressure, or 181,400 lbs., which gives us 3.9 lbs. of pressure per pound of car, for a speed of practically five miles per hour, to compare with the tabular values of 5.8, 10.6 and 6.6.

The conclusion seems to be forced that the measured values are affected by a serious error from some undiscovered cause, or that friction draft gears do not act in service as they do under laboratory conditions. It is possible that light may be thrown on this point by tests that have been made and with which the writer is not familiar. It does not seem unreasonable that the friction in these gears may act differently under a blow and under a static load. The wedges may jam, and the co-efficient of friction will vary with the condition of the surfaces in sliding contact. It would be an easy matter to test these possibilities by the use of a pendulum weight to strike these gears blows of known energy and quickness, and by measuring the corresponding compressions of the gears when in service and under laboratory conditions respectively.

The above discrepancies between theory, based on static measurements, and the results obtained by this investigation under dynamic conditions, emphasize, in the writer's opinion, the necessity for a further and more complete investigation of this important question and preferably by the Master Car Builders' Association. We need, for use by railway employees and loading foremen, definite rules for calculating the strength of blocking and bracing used to protect packages of valuable, fragile or dangerous freight from injury in transit.

DISCUSSION.

The discussion on Col. Dunn's paper was rather meager, as there were but three speakers. In presenting the details of the results obtained with the apparatus on his car, Col. Dunn called attention to the vibration in the pressures as indicated by the diagram. This rose to a maximum, dropped nearly to the zero line and rose again. He attributed it to the spring action of the draw-bars of the cars that had been struck, though no measurements were taken and it was only a surmise that this occurred. In his discussion, George L. Fowler suggested that such a vibration might have been caused by air in the pipes and apparatus itself. Although pains were taken to get all of the air out of the system it might well happen that comparatively large quantities had been entrapped. The roughness of the inside surface of the 3-in. pipe used would contain innumerable pockets which could hold enough air to make a very perceptible cushion and so cause the vibration. He recommended that, if water be used, it be boiled and then carefully put in so that no air would be entrained. Better than this would be the use of a mixture of alcohol and glycerine, which he had found to be most satisfactory in his own work.

It was especially urged that the work begun by Col. Dunn be continued until definite and thoroughly reliable results had been obtained. To do this it would be well to begin at the beginning and ascertain just what the practice was as to the speeds at which cars were run together in yards; the members present were challenged to produce one bit of accurate information as to what is being done in the yards, a challenge that received no reply. From this it was urged to be useless to attempt to regulate this matter until it was known what was to be regulated. It appeared, from what was said, that these experiments on the Pennsylvania Railroad under the supervision of Col. Dunn are the only ones ever made in the field, the data from which is available, and that everything remains to be done.

LOCOMOTIVE HEADLIGHTS AND OBSERVATION OF SIGNALS.*

BY PROF. C. H. BENJAMIN,
Dean of the School of Engineering, Purdue University.

Some experiments with headlights were made under my direction during the months of October and November, 1909. The experiments were conducted at the request of W. J. Wood, chairman of the Railway Commission of Indiana.

It was proposed originally to include oil, acetylene and electric lights in the experiments, but lack of time necessitated omitting the acetylene light. The object of the tests was to determine the relative effect of oil and electric headlights upon the reading of signal lights and the identification of obstacles, and by suitable laboratory experiments to determine the causes of the differences which might be found to exist. In order to arrange a programme which would be satisfactory to all parties concerned, I called into consultation H. F. Houghton, general superintendent of the Cleveland, Cincinnati, Chicago & St. Louis; D. F. Crawford, general superintendent of motive power of the Pennsylvania Lines; Professor Harding, of the School of Electrical Engineering at Purdue University, and Professor Endsley, of the Department of Railway Engineering. A programme was arranged by this committee which was subsequently carried out as far as time and circumstances would permit.

Mr. Houghton offered for the location of the road tests a section of the Big Four tracks near Avon, Ind., where a complete system of block signals for double tracks was available. Mr. Houghton also provided the necessary engines, headlights and other accessories for the experiment. Mr. Crawford supplied, for the accommodation of the observers, an observation car such as is used on the Pennsylvania Lines for inspection of track. This car, having an open front end and tiers of seats in amphitheater style, made it possible for each observer to obtain a clear view of the track and signals.

* Abstract of a paper read before the Western Railway Club, Chicago, April 19, 1910.

It was thought best to have a considerable number of observers to minimize the effect of individual error or personal prejudice. The list as finally agreed upon was as follows: Commissioners Wood, Dowling and McClure, Chief Inspector Shane and Consulting Engineer Garman, of the commission; Messrs. Baldwin and Young, of the Big Four; Mr. Cook, of the Pennsylvania Lines; Professors Ludy and Harding, of Purdue University, and the writer. Each observer recorded the results of his observations independently without consultation with others and the records were collected and preserved as made.

Manipulation of the signals and other objects observed was made by Mr. Rose, of the Big Four, and Professor Endsley, of the university. No observer knew the actual aspect of the signal or the nature of any obstruction. The general method adopted in all of the tests was to run the observation car back several thousand feet from the home station, when the signal was given by whistle to those manipulating the lights, obstructions, etc. The car was then run slowly forward towards the station, stopping at regular intervals for observations. The distances from the home signal were determined by numbered stakes previously located. Each observer was instructed to record what he saw or did not see, without consultation with others.

The first series of tests included experiments in reading the home signal at various distances under three sets of conditions:

(1) With opposing electric headlight;
(2) With opposing oil headlight;
(3) With no opposing headlight.

This series was carried out with an electric headlight on the observation car and repeated with an oil headlight.

When an opposing headlight was used, it was located on the adjacent track and 200 ft. in front of the home signal.

A brief study of the results shows the disconcerting effect of an opposing electric headlight. There was no general recognition of the signal until the observers were within 1,500 ft. while (with opposing oil headlight) identification was practically unanimous at the full distance of 5,000 ft.

Or, to put it another way, with an opposing electric headlight, practical unanimity was secured at 800 ft. and with an opposing oil headlight, a similar unanimity existed at 3,000 ft., or nearly four times as far.

When there was no opposing headlight the signal was recognized at 4,000 or 5,000 ft. without much difficulty.

The tests just described were repeated using an oil headlight on the observation car.

As far as the relative effects of the opposing headlights are concerned, the conclusions are the same as before. With electric headlight opposing, there was no unanimity in the reading of the signals until the observers were within 1,000 ft. With oil headlight opposing, and with no headlight opposing, there was nearly unanimous recognition at 4,000 to 5,000 ft.

In comparing this second series with that first mentioned, one important difference is noticeable, there are numerous instances of green lights being seen by observers at distances of 800 ft. and under, where no green light should have been visible. These phantom lights must have been due in most cases to light reflected from the lens of an unlighted lamp behind a green roundel, passing through the roundel and thus becoming green. A direct reflection from a roundel will be white or yellowish and not affected by the color of the roundel. This has been proved by experiment.

In the first test with electric headlight the upper right hand signal had a green roundel with an unlighted lamp behind it. At 600 ft., eight observers saw a green light in this signal and at 400 ft., seven were thus deceived.

Other tests show similar false lights. The reason for the reflections being visible at this particular distance is due to the angle of reflection being right for the observer at this point. We thus have numerous examples of a light which was out showing at safety.

This effect was not noticeable when the car was equipped with an oil headlight, probably because the light was not powerful enough to cause reflections visible at this distance.

Somewhat similar to the tests which have been described were the experiments made on classification signals. The observation car was retired to a distance as before, another engine with opposing headlight was then run onto the same track near the home signal. This engine displayed classification signals unknown to the observers. The car moved slowly towards the engine and observations were made at 400, 300 and 200 ft.

A study of the results shows that when an approaching engine has an electric headlight, the green signal is invisible at 200 ft. and over, while a white signal can be seen at 800 ft. or more. The opposing oil headlight obscures the classification signals but little; both white and green signals were read correctly by all at 600 to 800 ft., while some observers saw them at double this distance.

The effect of an electric headlight on the car was to diminish the distance at which the classification signals became distinctly visible.

This is particularly noticeable when there is any rain or fog present; the electric light produces a wavering ghostly sort of radiance, which at times is confusing.

During the tests which are described in this paper, the sky was overcast and there was a slight rain in the early part of the night.

A car on siding not in the clear was not noticed by the majority, even some of the railway men failing in this regard.

Dummies on the track were hardly noticeable at distances of over 200 ft. And, finally, two coal cars squarely on the track only became noticeable at about 1,300 ft. and were not identified until the distance was reduced to about 1,000 ft.

As to my own observations, I will say that I should not have noticed them as soon as I did, but for their hiding some green signal lights further down the track, with which I was familiar.

Some weeks later, Prof. Endsley and myself rode on an engine from Indianapolis to Terre Haute and return. The engine on the westward trip was equipped with an electric headlight while on the return another engine with an oil headlight was used. Nothing particularly new was learned on this trip, but the observations confirmed the conclusions previously formed. Phantom lights, both white and green, appeared at intervals on home and distant signals during the outward trip. At one station where the lights were all out comparatively brilliant white lights were seen, first in the distant signal and later in some of the lamps of the home signal.

With the electric headlight, conspicuous objects, such as crossing guards or highway bridges, could only be seen at distances less than 1,200 or 1,500 ft. As the train had a speed of about 60 miles per hour, distances could be determined approximately by counting. The home signals could be seen at about 1,500 ft. with the electric light, but could be seen further when the oil light was used.

The presence of an opposing electric headlight obscured all signals, both block and classification. This seemed to us to constitute the strongest objection to the use of such a light.

Subsequent experiments on the electric and oil lights used in the road tests were made at Purdue University. The laboratory experiments showed the electric light used to be very weak in the red rays and strong in the green rays. This in part explains the prevalence of green reflections in dead signals and the greater obscuration of green classification signals.

Out-of-door tests showed reflections from red and green roundels, and these were much more brilliant when the roundel was in front of an unlighted signal lamp. Due to the greenish character of the electric light, it was easy to get green reflections, while no red was observed in the reflection from a red roundel.

The following conclusions are taken verbatim from my report to the railway commission:

A. That an electric headlight on the engine of a train has one marked disadvantage, namely, the causing of reflections from glass roundels and lenses, thereby producing false or phantom signals. This is not due entirely to any peculiarity of the electric light, but to its great power and intensity, as compared with ordinary signal lamps.

B. That obstructions on the track can not ordinarily be seen with an electric headlight at a sufficient distance to prevent the probability of accident.

C. That an opposing headlight adjacent to block signals so obscures them as to make it difficult to read them correctly at distances exceeding 1,000 ft.

The signal experiments were followed by some tests to determine the limits of the visibility of various obstructions on the track.

Previous to each test, the observation car was run back some 2,000 ft. and on signal some obstruction was arranged by Messrs. Rose and Endsley.

Neither the nature nor the precise location of any obstruction was known to the observers. As the car was run slowly forward, each one tried to locate and describe the obstacle. Only the electric headlight was used in these experiments.

A speeder or tricycle on track was noticed at a distance of about 700 ft., but was not fully identified until the distance was 300 ft.

D. That an opposing oil headlight allows such signals to be read correctly at distances of 4,000 ft. or less.

E. That the electric headlight on an approaching engine obscures the classification signals on that engine to a marked degree; that this is noticeably true of green signals, as these are almost entirely obliterated by the glare of the electric light.

F. That an opposing oil headlight allows either white or green signals to be read at a distance of 400 ft. or even more.

I feel justified at the present time in stating my personal opinion in this matter, with the understanding that it is only my opinion and does not in any way commit my associates.

All of the tests which I have seen tend to convince me that it is a disadvantage to the engineer and fireman of a train to have an electric headlight on his engine, since it interferes with the correct reading of signal lights; and that it is still more a disadvantage to the crew of an engine to have electric headlights on engines which they meet on parallel tracks and at stations. Furthermore, I do not consider that the greater illumination of the track ahead or of objects on the track is any compensation for the disadvantages which have been mentioned.

If it be admitted that the engineer's responsibility is chiefly to his train and to the passengers dependent on his skill and faithfulness, it is evident that whatever interferes with his correct reading of signals on track or engine is to be condemned, however much it may help to warn chance pedestrians of the approach of danger.

RAILWAYS IN ARGENTINA.

In 50 years Argentina has increased her length of railways from 23 kilometers to 25,000. The following figures, taken from the "Review of the River Plate," show the progress the country made during that period:

	Carried	
	Freight, tons.	Passengers.
1857 to 1860	22,248	520,637
1860 " 1865	140,104	2,004,752
1865 " 1870	641,990	7,159,304
1870 " 1875	1,849,730	12,037,756
1875 " 1880	3,661,317	12,369,308
1880 " 1885	7,377,171	18,614,025
1885 " 1890	20,896,262	41,455,352
1890 " 1895	31,392,114	59,449,472
1895 " 1900	50,794,332	82,725,001
1900 " 1905	77,314,504	101,852,186
1905 " 1910	145,200,000	202,400,000

TRAIN ACCIDENTS IN MARCH.[1]

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of March, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	No. persons reported Kil'd.	Inj'd.
2.	Balt. & O. S.W.	Flora.	rc.	P. & Ft.	2	3
†3.	Illinois Cent.	Hanson.	bc.	Ft. & Ft.	3	8
*16.	N. Y. Cent.	Rochester.	rc.	P. & P.	1	3
22.	Louis. & Nash.	White Jn.	bc.	Ft. & Ft.	3	12
22.	Pennsylvania	Erie.	bc.	Ft. & Ft.	0	3

Derailments.

Date.	Road.	Place.	Cause of derlmt.	Kind of train.	No. persons reported Kil'd.	Inj'd.
†1.	Pennsylvania	Rock Point.	unx.	Pass.	3	6
1.	Norf. & Westn.	Oakvale.	slide.	Ft.	1	2
†1.	Gt. Northern	Wellington.	slide.	Ft. & P.	89	15
*2.	Gt. Northern	Milan.	slide.	Pass.	2	10
*4.	Northern Pac.	Eddy, Mont.	unx.	Pass.	0	5
*5.	C., R. I. & Pac.	Smith Center.	b. rail.	Pass.	0	3
15.	N.Y., N.H. & H.	Springfield.	unx.	Pass.	0	3
†15.	M., K. & T.	Broken Arrow.	d. coupler.	Ft.	1	4
*20.	Gt. Northern	Rogers, Minn.	unx.	Pass.	1	13
20.	O. R.R. & Nav.	Pendleton.	unx.	Ft.	2	0
20.	O. R.R. & Nav.	Pendleton.	b. rail.	Ft.	0	0
21.	M.,St.P.& S.S.M.	Bismarck.	b. tire.	Pass.	0	28
†21.	Chic. Gt. Wstn.	Gladbrook.	unx.	Pass.	50	34

The accident at Wellington, Wash., March 1, when a passenger train standing at the station and a mail train standing nearby, but not occupied by passengers, were swept down the side of the mountain by an avalanche, is the worst railway disaster that has happened in this country for a number of years.* The list of casualties includes 51 passengers, 10 mail clerks, 22 trainmen and six other railway employees killed; and seven passengers, one mail clerk, six trainmen and one other railway employee injured.

These two trains had been detained at Wellington because of blockades on the line, due to heavy snow slides and to warm weather, which melted the snow on the mountainside. The accident was briefly reported in the *Railway Age Gazette* of March 4, page 459. An officer of the road writes: The slide occurred early in the morning of March 1. It was at a point where we have never had one before, and where, from the lay of the ground and conditions generally, no one ever expected such a thing. The snow on the top of the mountain was from 12 ft. to 18 ft. deep on a level, it being the heaviest snow that had ever fallen so late in the season in such a short space of time.

Prior to the storm, which began about February 20 and lasted practically ten days and nights continuously, most of the snow had melted; and then it turned cold and froze, making the mountain rather slippery, and the heavy snow storm followed. In addition to this there was a heavy electrical storm, which is uncommon in the mountains. There was continuous lightning and the mountain was shaken by loud peals of thunder; and it is thought that this started the slide. There was a large number of other slides in the Cascade Mountains the same night. Some people are of the opinion that there was a slight earthquake shock which caused

[1] Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, unexplained——derail, open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of boiler of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (includes empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

*The more recent railway accidents in the United States, which may be considered as of the first magnitude, are the following: Honda, Cal., May, 1907, number of persons killed, 32; Alta Vista, Kan., January, 1907, killed, 34; Terra Cotta, D. C., December, 1906, killed, 43; Woodville, Ind., November, 1906, killed, 48; Atlantic City, N. J., October, 1906, killed, 57; Adobe, Colo., March, 1906, killed 34; New Market, Tenn., September, 1904, killed 59; Eden, Colo., August, 1904, killed, 94.

this slide, as the catastrophe here and the one in Canada occurred at practically the same time.

The derailment at Milan, Idaho, on the second, was caused by a landslide, and the engine and first three cars of the train fell down a 50-ft. bank. The train was the Oriental Limited, No. 2, and had on board about 175 passengers. The engineman had but a short view of the track ahead, and the train struck a mass of rocks at full speed. Three cars were destroyed by fire, being ignited by coals from the locomotive fire box. The fireman jumped off and was killed and the engineman was injured.

The newspaper accounts of the two derailments near Pendleton, Oregon, on the twentieth, indicate that the first one was of a locomotive, running without train, and both the engineman and the fireman were killed. The engine fell down the bank at the side of the road. But in the derailment it had broken a rail, and, there being no survivor to put out a signal, an extra freight train, which followed 20 minutes later, was thrown off the track, and the engine and five of its cars fell down the bank at the other side of the track and lodged in the Umatilla river. The men on the freight train escaped injury by jumping into the water. Here is an instance where the absolute block system would have prevented a derailment.

The derailment which occurred between the stations of Green Mountain and Gladbrook, Iowa, on the 21st, was reported in the *Railway Age Gazette* of March 25, page 841. At last accounts the number of persons reported killed and injured was as follows:

Passengers killed	44
Passengers injured	31
Employees killed	5
Employees injured	2
Others killed	1
Others injured	2

The train consisted of two engines and ten cars, both engines running tender first. The train belong to the Chicago, Rock Island & Pacific, but was running over the Chicago Great Western because of a blockade. It was, in fact, composed of two trains, backing from Marshalltown to Waterloo with the engines running backward, but preceding the cars. The train was running at about twenty-two to twenty-five miles an hour. The cause of the wreck has not been determined, and whether it was the forward tender or the forward engine which left the track first is not known. The pilot man of the Chicago Great Western, who was on the leading engine, was killed, as were all the rest of the men on both engines, except one. It is certain, however, that the forward engine left the track before the second engine did, and plunged immediately into the soft clay cut, causing the violent stoppage and consequent piling up of the cars. The first car from the engine was a sleeper; then came the lighter coaches, and then again a sleeper and other coaches. The chair car was crushed between the first sleeper and the coaches following, and it was in this car that most of the loss of life occurred. The day coach was completely wrecked, the wooden portion of the car being broken into splinters and the steel broken and rolled until the wreck of the car occupied a space but little larger than ten or fifteen square feet. The third car was badly wrecked, but was not totally demolished.

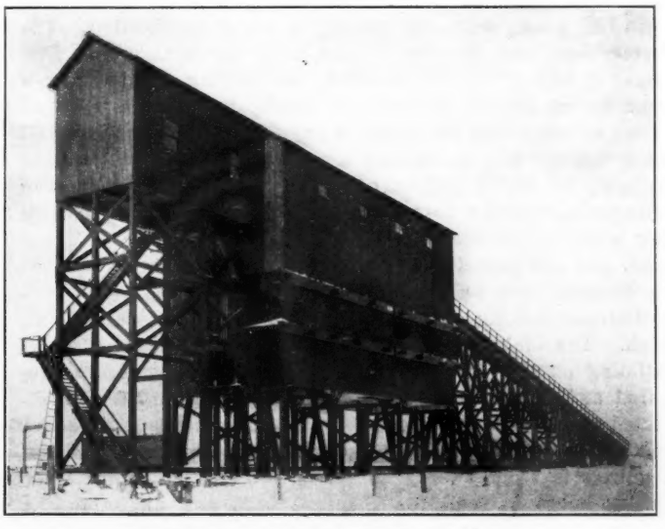
This accident was investigated by the state railroad commission of Iowa on March 29 and 30, but no report of the investigation has yet been issued. The newspaper accounts of this investigation say that it developed that the leading engine was the first to leave the track; that the roadbed at the point of derailment was soft, yet the track was in good condition; and that the speed of the train did not exceed 22 to 25 miles an hour. The commissioners examined 37 witnesses. Following the public hearings, representatives of the commission obtained statements from many eye-witnesses in the immediate vicinity of the wreck, who saw the train within 30 seconds after the accident. These witnesses were uniform in their statements that the train was running slowly and smoothly, and that there was no rocking or uneven motion to the tenders or engines. The accident occurred at the top of a grade on a straight piece of track.

The list of electric car accidents of which we have found reports in the newspapers as having occurred in the United States in the month of March includes three rear collisions, one butting collision, one derailment due to a runaway on a steep grade and one wreck of a street car by being struck by a locomotive. The derailment caused one death; and the butting collision, which was between high speed cars on an interurban line near Lima, Ohio, and was due to a mistake in connection with telegraphic orders, caused two. One of the rear collisions was at Sixth avenue and Twenty-third street, New York City, in the tunnel of the Hudson & Manhattan. The speed of the moving train was low, but credit was given to the anti-telescoping frames of the cars, and the device for preventing one car floor from forcing the floor of the next car upward, for mitigating the effects of the collision. The total number of persons reported injured in the six accidents was 84.

NEW LOCOMOTIVE TERMINAL OF THE VANDALIA AT TERRE HAUTE.

The Vandalia has about finished a complete new locomotive terminal at Terre Haute, Ind. The general arrangement with details of the principal structures is here illustrated. The house is located near the intersection of the Vandalia and the Southern Indiana and close to the Dewey cut-off line.

There are four tracks approaching the inspection pits for



Coaling Station at Terre Haute.

inbound and outbound engines. The inspection pits are about 925 ft. east of the roundhouse, and there are cross over tracks at each end so that engines on either of the approaching tracks can go on to either pit. The coal wharf spans seven tracks and the incline track leading to it is at right angles to the approaching tracks. The coal cars are taken around a 16-deg. curve to parallel tracks where there is storage for 12 loaded and 12 empty coal cars, and from this point they are delivered to the incline. The complete structure for the coal wharf was designed and built by the Roberts & Schaefer Company, Chicago. The sandhouse and water cranes are just beyond, and next are the ash pits, 400 ft. from the house.

The coaling station is a steel structure supported on wooden posts and provides coaling facilities for six engines. The coal cars are hauled up an incline of 1 in 20 by a Lidgerwood hoist having a duty of 36,000 lbs. at a speed of 35 to 40 ft. per minute. The drum is 40 in. in diameter by 40 in. face. The hoist is provided with steel gears, automatic brake and regular lowering brake, and is operated by a 50 h.p., 220-volt, General Electric motor running 850 revolutions per minute.

The upper floor is about 45 ft. above the track level. The coal pockets provide storage capacity for 750 tons of coal and are lined with No. 10 steel. The bottoms of the pockets have a slope of 45 degs. and are hoppered at the corners so that all the coal runs out by gravity.

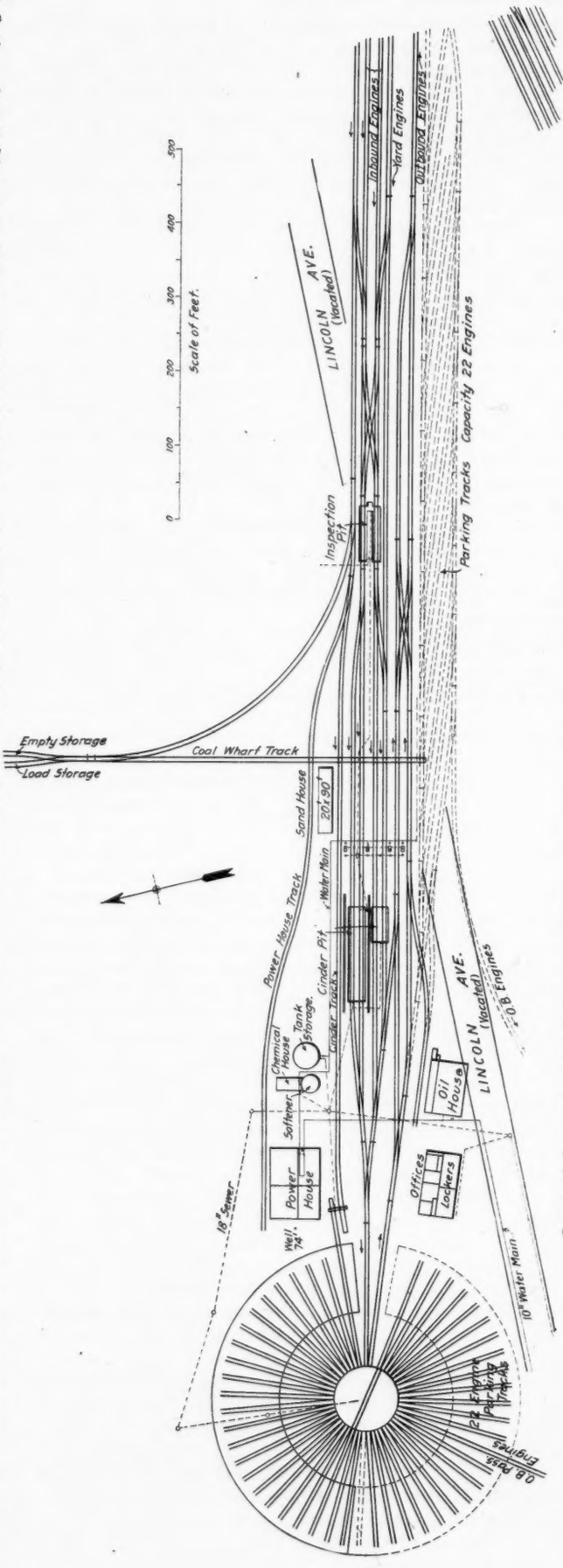
Two 36-in. plate girders support the track for the coal cars. The entire upper surface of the pockets is covered with ¾ x 6-in. breaker bars, spaced 6 in. in the clear, which prevent large lumps of coal from going into the pockets. The roof is of common boards covered with Perfected granite roofing. The sides are covered with Duck Back brand asbestos protected metal. The entire under side of the pockets is covered with ⅛-in. transite board in order to protect the structure from locomotive sparks. Six sets of under-cut gates and hooded aprons are provided for the delivery of the coal from the storage pockets to locomotives.

The dry sand bins are placed under the apex of the coal hoppers. There are three of these, two with a capacity of 12 tons and one with a capacity of 15 tons; they are provided with sand pipes for delivering sand directly from the bin to the locomotive. There are three independent steel sand drums, one for each bin, together with the necessary piping for raising sand by air pressure from the sand house to the sand bins.

The cinders are handled by clam shell buckets and gantry cranes, supplied by the Whiting Foundry Equipment Company, which also furnished the jib cranes for the roundhouse. There are two tracks over the ash pit and a cinder track alongside. From this point the tracks converge and two of them enter the roundhouse. To the north and near the roundhouse is a power house and chemical house with two tanks for water purification. The latter plant was installed by the L. M. Booth Company, Chicago; it is a "Type F" machine, the settling tank having a capacity of 206,300 gallons. A description of this type of water softener will be found on page 386 of the February 19, 1909, number of the *Railway Age Gazette*. It has a treating capacity of 40,000 gallons of water per hour and is of the automatic, variable rate, continuous treatment type, operating with full efficiency under all fluctuations between 25 per cent. and full capacity. The steel settling tank is 26 ft. 6 in. in diameter and 50 ft. high. Inside of it at the center is a cylindrical mixing tank 8 ft. 6 in. in diameter, and 47 ft. high. The slaking tank and chemical tank are in a small building on the ground level. Here the chemicals are prepared and the working parts requiring attention are concentrated so that it is unnecessary for the attendant to climb to the top of the tank for that purpose. The only attention required is from twenty to thirty minutes at intervals of twelve hours to refill the chemical tank and discharge the sludge. All power required for stirring, for mixing, for raising, treating chemicals, etc., is obtained from the water as it flows into the softener for treatment.

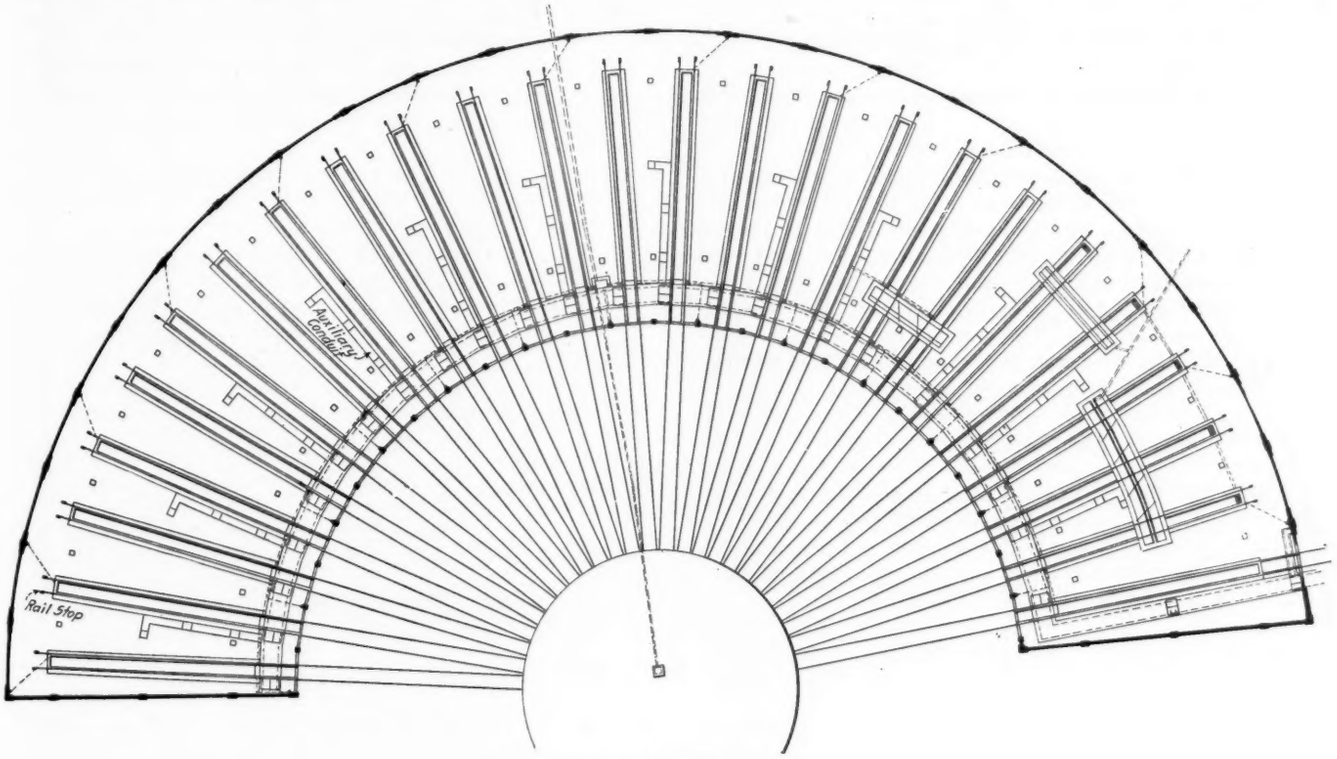
The chemical tank holds a supply of reagents for a 12-hour run at full capacity. The chemical regulator automatically and instantaneously varies the amount of reagents delivered to the mixing chamber in exact proportion to the amount of raw water entering, so that the treatment is uniform regardless of variations in the use or supply of water. The purpose of the mixing chamber is to bring and hold the chemicals and impurities in intimate contact during the time required for complete reaction and precipitation. This mixing chamber is of such size that one-half hour or more is required for the raw water with added reagents to pass through, and during this time they are continuously stirred together by slowly revolving paddles. The sludge formed in the treatment collects in the bottom of the main tank and is blown out every twelve hours by opening the sludge valve for a few seconds. To the south is the office and oil house. The oil house has a complete equipment of the Bowser tanks and measuring pumps.

The large roundhouse is 95 ft. wide and will eventually have

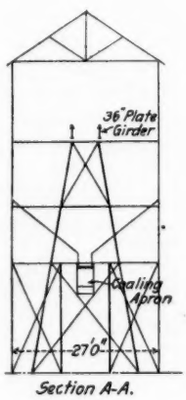


General Layout; Vandalia Locomotive Terminal at Terre Haute, Ind.

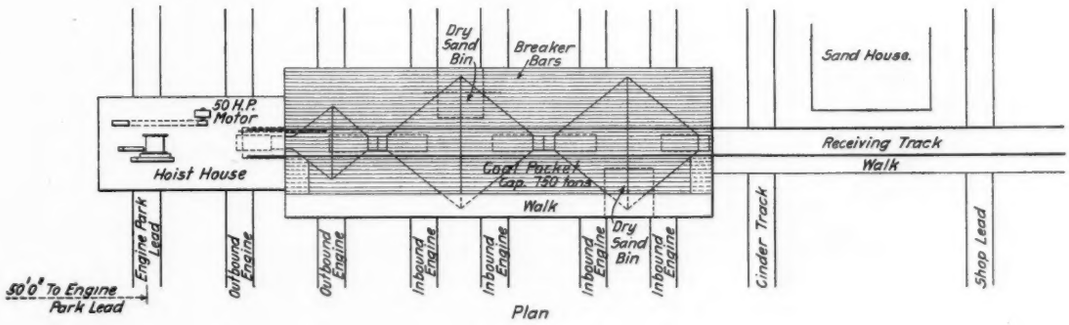
capacity for 47 engines. The half circle now building has a capacity for 25 engines. The turntable is 90 ft. long and the distance from the pit to the inner wall of the house is 75 ft. The plan shows the large pipe conduit on the inner circle for cold water, hot water, steam and compressed air pipes. There are three drop pits, one large one spanning three tracks for driving wheels, one for engine truck wheels and one for tender wheels. For driving wheels a special 15-ton Watson & Stillman hydraulic jack is used, and for truck wheels a telescopic air jack. The last two pits span two tracks. The cross section of the house shows it divided into three spans, one 16 ft. wide and 18 ft. 7¾ in. high at the outer circle; then a central section 58 ft. span with a high deck and deep wooden truss. The smokejack with a long hood extends through this deck. The swinging sashes in the upper deck provide a large opening for ventilation, as they are about 9 ft. long at the outer



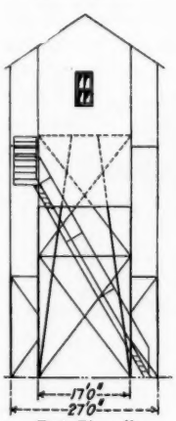
Floor Plan; 95-ft. Engine House.



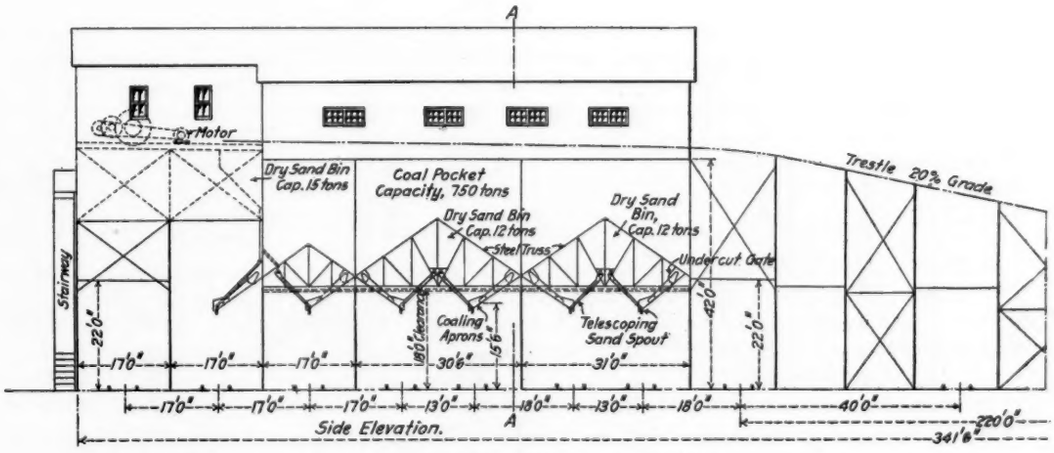
Section A-A.



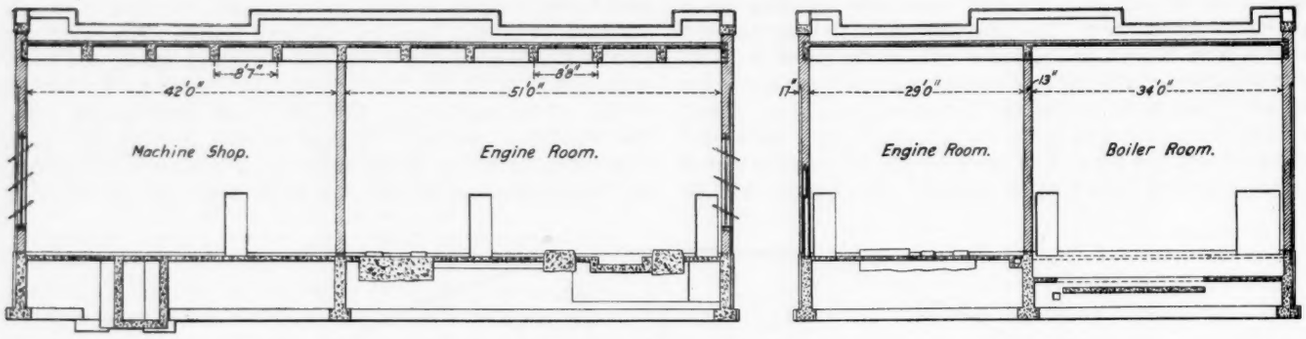
Plan



End Elevation.

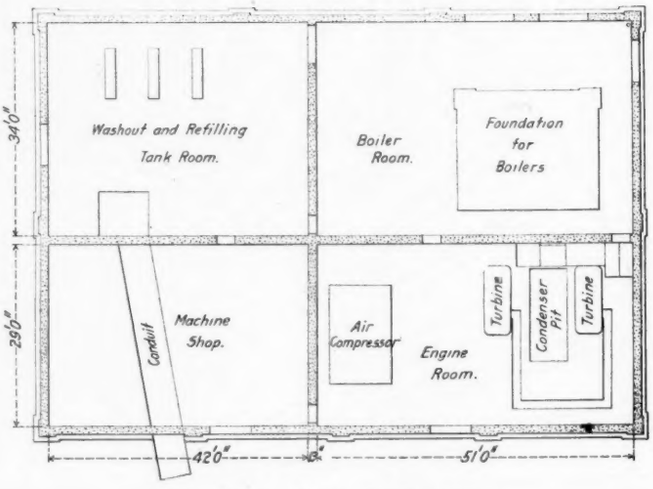


Coaling Station at Terre Haute, Ind.; 750 Tons Capacity.



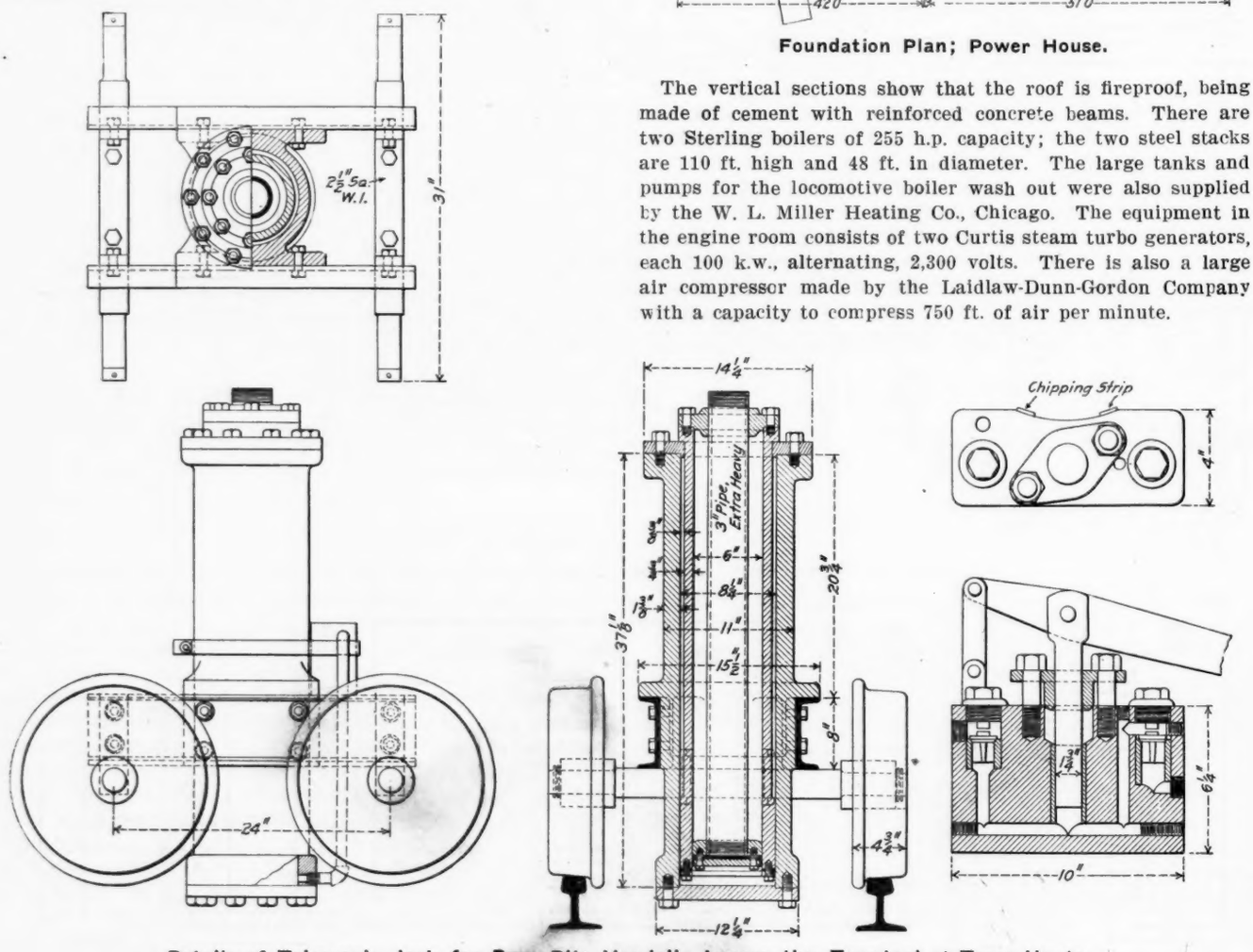
Sections of Power House.

circle; just under the sash there is a plank walk extending around the house. The span at the inner circle is 21 ft. wide and 18 ft. 5¼ in. high. The roof has a pitch of ½ in 12, and is covered with felt and gravel, to Barrett specification. The section also shows the jib crane attached to outer pillars having a swing of 10 ft. 9 in. The 6-in. cast-iron down pipe is inside the house along the inner posts and a 4-in. pipe inside the outer wall. In the power house are wisely concentrated several departments, each of which sometimes occupies a separate small building. In addition to the boiler room and engine room there is a machine shop and a good sized room for the washout and refilling system. The latter is perhaps here for the first time recognized as of such prime importance as an essential to roundhouse equipment as to have provision made for it in the building plan. The boiler room is 36 ft. x 51 ft.; the engine room, 29 ft. x 51 ft.; the machine shop, 29 ft. x 42 ft., and the tank room, 36 ft. x 42 ft.



Foundation Plan; Power House.

The vertical sections show that the roof is fireproof, being made of cement with reinforced concrete beams. There are two Sterling boilers of 255 h.p. capacity; the two steel stacks are 110 ft. high and 48 ft. in diameter. The large tanks and pumps for the locomotive boiler wash out were also supplied by the W. L. Miller Heating Co., Chicago. The equipment in the engine room consists of two Curtis steam turbo generators, each 100 k.w., alternating, 2,300 volts. There is also a large air compressor made by the Laidlaw-Dunn-Gordon Company with a capacity to compress 750 ft. of air per minute.



Details of Telescopic Jack for Drop Pit; Vandalia Locomotive Terminal at Terre Haute.

REINFORCED CONCRETE TRESTLES.*

There are, on most roads traversing the Mississippi valley, a great many pile trestles in river bottoms, and over bayous or swamps, which may not be filled and which, if replaced with steel bridges on permanent supports, would be extremely expensive. The necessity for retaining the entire existing opening is, in many cases, perfectly obvious. In most of these cases there is no need for spans of great length, there being neither ice nor drift to catch upon supports placed closely together. For such bridges, having lengths from 100 ft. to 1,000 ft. or more, the writer has devised a reinforced concrete construction, following the main features of the timber trestle.

The great economy of the pile trestle is largely due to the small amount of work necessary to be done in the field. There are no cofferdams, foundation pits, or falseworks, and little raw material has to be unloaded and cared for. All members are taken out and put in place, often largely by machinery, with a minimum of disturbance of the track and delay to traffic. A concrete structure embodying these features was built and tested, and after that had been completed a standard plan was drawn up, which plan is shown in Fig. 1.

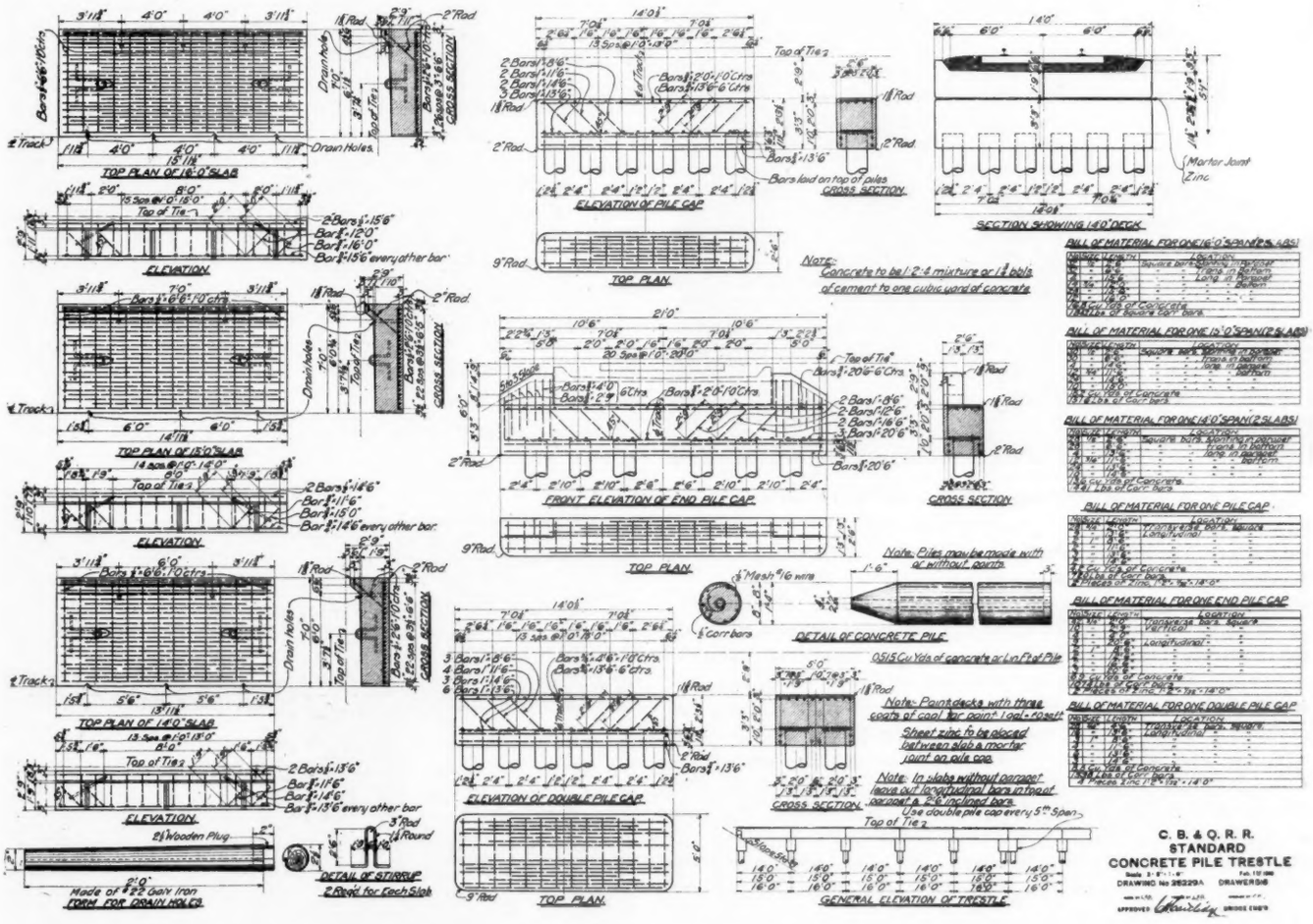

TOP PLAN OF 16'-0" SLAB
ELEVATION
TOP PLAN OF 15'-0" SLAB
TOP PLAN OF 14'-0" SLAB
CROSS SECTION
ELEVATION OF PILE CAP
TOP PLAN
FRONT ELEVATION OF END PILE CAP
ELEVATION OF DOUBLE PILE CAP
DETAIL OF CONCRETE PILE
DETAIL OF STIRRUP
FORM FOR DRAIN HOLES
GENERAL ELEVATION OF TRESTLE
SECTION SHOWING 14'0" DECK
BILL OF MATERIAL FOR ONE 16'-0" SPAN (2 SLABS)
BILL OF MATERIAL FOR ONE 15'-0" SPAN (2 SLABS)
BILL OF MATERIAL FOR ONE 14'-0" SPAN (2 SLABS)
BILL OF MATERIAL FOR ONE PILE CAP
BILL OF MATERIAL FOR ONE END PILE CAP
BILL OF MATERIAL FOR ONE DOUBLE PILE CAP
C. B. & Q. R. R.
STANDARD
CONCRETE PILE TRESTLE
DRAWING No 26229A
DRAWER 248

Fig. 1—Standard Concrete Trestle; Chicago, Burlington & Quincy.

This construction is suited only for shallow openings, and it is the writer's practice to limit the height of concrete pile trestles to 16 ft. from ground line to base of rail. For greater heights it is his practice to substitute thin piers for the pile bents, although at considerably increased cost. In Fig. 2 is shown a view of the first trestle built, and experience in its construction led to some modifications in accordance with the standard plan of Fig. 1.

In the bridges so far built, concrete piles of two kinds have been used—one being molded in horizontal forms and the other made by rolling in a machine, under the Chenoweth patents. The molded piles were 16 in. sq. at the butt, had a 4-in. chamfer at each corner, a taper of 4 in. in 30 ft. on each face, and were pointed at the tip. The reinforcement was assembled on a mandrel and the spiral hooping wound around it by turning the mandrel. After the hooping was in place it was tied at frequent intervals with No. 16 soft wire, and the complete reinforcement was then withdrawn from the mandrel.

The forms were of wood, unlined and made so that the sides could be removed as soon as the concrete was firm; the pile was left on the bottom boards until hard enough to stand handling. The concrete, composed of one part of cement to four and one-half parts of gravel, mixed to a slushy consistency, was poured in. The gravel was generally screened so that all the sand and pebbles one-half inch in diameter or less were retained and used, the coarser aggregate being rejected. The piles were allowed to harden at least 30 days before being shipped. This seems to be about the least time which can be allowed, as attempts to ship and drive piles of less age have not been successful. More extended seasoning is often easily obtained and is to be preferred.

Rolled piles are made in a machine consisting essentially of a movable platform, a shaft or mandrel, and means for moving and turning the piles, together with rolls for holding them in line during fabrication. The piles, when fabricated, are stored in a seasoning yard and sprinkled frequently to assist the hardening of the concrete.

*From a paper read before the Western Society of Engineers on April 13, by C. H. Cartlidge, bridge engineer, Chicago, Burlington & Quincy.

A somewhat incomplete comparison of the first year's costs of rolled and molded piling indicates that there is little difference in the cost of the two kinds. As the cost of making reinforcement for the molded piling was one of the principal items, it was decided to experiment with molded piling made without taper, the idea being to use a wire fabric, as reinforcement, which could be simply folded into a square and wired together at the lap, thus avoiding considerable labor. The cost of forms is also much reduced if they are not tapered. An efficient plant was designed, but in spite of the economy achieved no great difference in the cost has resulted, partly because of the difficulty of handling the square piles. On the whole, in the absence of definite comparative tests, the writer is inclined to favor the

Fig. 2—Reinforced Concrete Pile Trestle.

rolled pile. It is probable that each form of pile will be found to have its own place and use.

As yet, no soil has been encountered in which wooden piles could be driven and in which it has not been possible to drive the concrete piles. It is necessary to lift the drop hammer somewhat more slowly for the concrete pile than for the wooden pile, in order not to set the driver in vibration. A cushion of some elastic material must be placed between the hammer and the pile, and with this precaution very little damage to the head of the pile results, even after long continued driving. It is surprising how much punishment a well seasoned pile will stand. When it is necessary to drive the pile below the leads, as is generally the case, the follower is placed on top of the cushion. As the loads on these piles are great it is necessary to drive them to refusal, so that accurate knowledge of the required length is necessary. In case it is found that the piles so driven do not reach the elevation called for on the plans, the depth of the cap is increased accordingly. If it is found impossible or impractical to drive the piles to the depth anticipated, they can be cut off without difficulty. The cut need not be a smooth one, as the casting of the cap will take care of all irregularities of the head of the pile. Should settlement occur in a finished bent, the strength of the cap is important, so that the loads may be equalized and even settlement result. Experience has shown that the design of Fig. 1 provides sufficient strength. Slight settlement has taken place in two bridges but without causing cracks or damage. As the settlement was doubtless due to the fact that the piles had not been driven to refusal, a mass of concrete was placed about each settled bent, extending from just below the ground line to about three feet below; the slabs were jacked up to grade and a layer of concrete was placed between them and the caps. This is shown in Fig. 3.

The manufacture of the floor slabs is best accomplished in a convenient yard, where advantage can be taken of economical methods. It is necessary to provide a firm, unyielding bed. The sides and ends of the forms are removable, and as one span consists of two slabs, a temporary partition is placed in each form to be removed after a half span has been completed. A layer of paper is placed against the slab and the remaining half is cast. Drainage holes are also cast along the dividing line.

By referring to Fig. 1 it will be seen that U-bolts or stirrups are set in the upper part of the slab to permit of its being easily handled. These are set at an angle so that there may be a direct pull when attached to a chain, obviating the necessity for a toggle-beam when lifting and placing the slabs.

After the slabs have remained in the forms for from two to four weeks, they are lifted by a locomotive crane and piled to one side until hard enough for service, the minimum time for seasoning being three months. When seasoned they are readily erected by the same crane, a mortar joint being placed between the bottom of the slab and the cap.

After being erected the slabs are painted on top with a waterproofing compound, and the joints over the caps are filled with a mastic of tar or asphalt and sand. It is better to fill these joints with such material than to allow them to fill with sand, as the former will admit of the slight expansion necessary. Thus far, the best material for waterproofing, with which experiments have been made on work under the direction of the writer, has been found to be a paint made of coal tar, Portland cement and kerosene. This compound not only covers the surface but sinks into and bonds with it, so that two or three coats are sometimes required. It is put on with paint brushes like ordinary paint. Another valuable at-

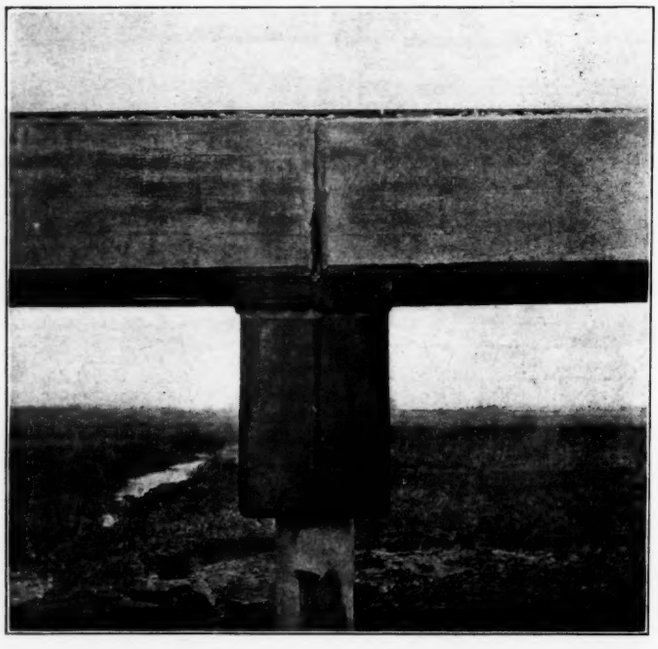


Fig. 3—Concrete Girder Levelled Up After Settlement.

tribute is its ability to adhere to moist or even wet concrete. Still another, and not its least recommendation, is its very low cost.

The double bents are designed to take up such longitudinal stresses as might be apt to place undue bending on the piling. As a matter of fact the stiffness and weight of the floor are such that it is somewhat questionable whether the double bents are necessary. It seems well to put them in, however, as an extra precaution.

With men experienced in this work, several bridges of lengths of from 80 to 250 ft. have been built at a total cost of from $20 to $26 per lineal foot, and on lines carrying heavy

traffic, while in one or two short bridges of two or three spans, the cost has been as high as $45 per foot. For estimating, a cost of $30 per lineal foot plus a constant of $300 will be ample for the design shown.

For bridges having a height above the ground line greater than 16 ft., a plan involving the use of thin piers is preferable. Photographs of such structures are shown in Figs. 4 and 5. The piers are heavily reinforced and are generally founded on wooden piles cut off five or six ft. below the ground line. Because of the greater cost of these piers, it is generally economical to make the spans longer than 16 ft., spans of 18 to 25 ft. being common. A great number of such bridges have been built and have so far developed no defects. When the

Fig. 4—Through Girder Concrete Trestle with Piers.

spans are as long as 25 ft., however, it is impracticable to build the slabs in a plant away from the bridge, because of their great weight. In general, it has been found best to build them on false work adjoining their final position and jack them into position.

The writer wishes to lay especial stress upon the necessity for the use of the best materials and the most skilful labor on such work. The comparative novelty of reinforced concrete makes necessary a most efficient organization for the work, and the placing of all possible safeguards to insure its integrity. Such organization and safeguards have been in effect in the case of steel construction for so long that they have become matters of course, and when reinforced concrete is carried on with similar care and scrupulous watchfulness, no fear need be felt as to its value as a material of construction.

It is possible, under some specifications, to design short span steel bridges on concrete supports which will be as cheap as the designs described herein, but not, the writer believes, of equal strength to the bridges shown in these designs. Further, if the obvious advantages of ballasted, noncorrodible, fireproof bridges be considered, it will be seen that there is a preponderance of good qualities on the side of the reinforced concrete construction.

DISCUSSION.

Prof. Arthur N. Talbot (University of Illinois [by letter]): Concrete piles in foundations are usually placed in large groups and are so tied together by the structure itself that the individual responsibility of a single pile is much less than in a trestle. Concrete columns as frequently constructed are subject to possible variation in quality of concrete in different parts, giving opportunity for local weakness. Weak spots are especially apparent in a column which has to be driven as a pile. It might seem, then, that the concrete pile would be an element of weakness in a structure of this kind. To the writer the existence of weak spots in piles made by the rolling process seemed extremely probable, and, as there are others who may still hold this view, he presents the following tests of rolled concrete piles as having a bearing upon the strength and uniformity of this form of construction.

Compression Tests of Rolled Concrete Piles.

Specimen.	Length Ft.	Length in.	Equivalent diam., ins.	Area, sq. in.	Maximum applied load, lbs.	Av. unit stress, lbs. pr sq.in.	Age at test, mos.	Remarks.
1	24	4	14.4	163	280,000	1,720	4	Failed along a diagonal plane abt. 8 ft. from top.*
10	24	3	14.1	156	264,000	1,690	4½	Failed by shattering at top and bottom.
10A	19	9	14.1	156	401,000	2,570	12	This is No. 10, with the injured ends cut off.†
9	20	7	15.0	177	231,000	1,300	4	Shattered at top.
9A	19	3	15.0	177	350,000	1,980	12	This is No. 9, with the injured top cut off.‡
2	20	5	15.3	184	260,000	1,410	4	Failed at top by bulging & splitting. Wires broken at end.
7	20	3	14.4	163	271,000	1,660	4	Failed by shattering and splitting at top.
7A	17	0	14.4	163	319,000	1,960	4	This is No. 7, with about 3 ft. cut from top.§
7B	14	0	14.4	163	356,000	2,180	4½	This is No. 7A, with about 3 ft. cut from bottom. Failed by splitting near top.
4	20	0	15.0	177	214,000	1,210	4½	Failed by shattering and splitting at bottom.
5	16	6	15.0	177	257,000	1,450	4	Failed by bulging and splitting at bottom. Long cracks extending 18 in. high.
8	16	6	14.8	172	176,000	1,020	4	Shattered at bottom.
3	16	0	14.1	156	279,000	1,790	4½	Top shattered.

*Many wires broke and long rods buckled at and near point of failure.
†Failed along diagonal plane about 3 ft. from top.
‡Failed by shattering at bottom. (Original end.)
§Failed by shattering at bottom.

The rolled concrete piles were furnished for these tests by the American Concrete Company and were made at Racine, Wis., December 1, 1908, at the plant which fabricated the piles used in a bridge foundation. The concrete was reported to be one part Universal Portland cement, two parts Torpedo sand and four parts broken stone, size 1 in. and less. The lengths ranged from 16 to 24 ft. The section was somewhat elliptical, but the average diameter was about 14 in. The longitudinal reinforcement consisted of 5 or 6 half-inch square twisted steel bars spaced fairly uniformly and just within the light wire netting which surrounded the pile. There were several turns of No. 14 wire at intervals of about 16 in., which were for use in holding the concrete and netting in place after

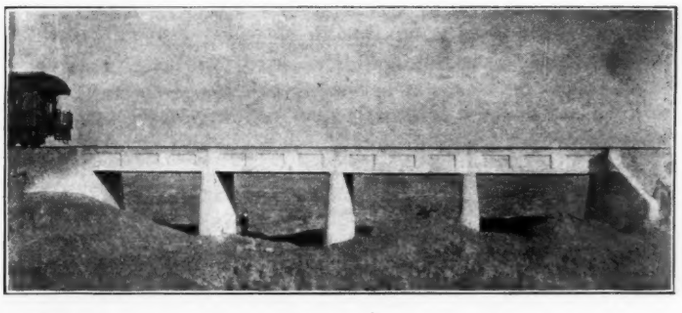


Fig. 5—Concrete Trestle with Piers over 16 Feet High.

fabrication. It is seen that the steel reinforcement is light and will not give much additional strength. The piles were shipped to the laboratory when about two weeks old. They were fairly straight, with both ends square instead of having a point at one end. As is usual with this method, the irregular space at the end of the pile formed in the rolling process had been filled in with concrete at the time of fabrication. The tests were made in the 600,000-lb. vertical screw testing machine at the University of Illinois. A few hours before loading the pile was set in place in the testing machine and the ends were bedded in plaster of Paris. The lower end rested on the bed of the testing machine. The load was trans-

mitted to the top of the pile through a hemispherical bearing block. The results are given in the table.

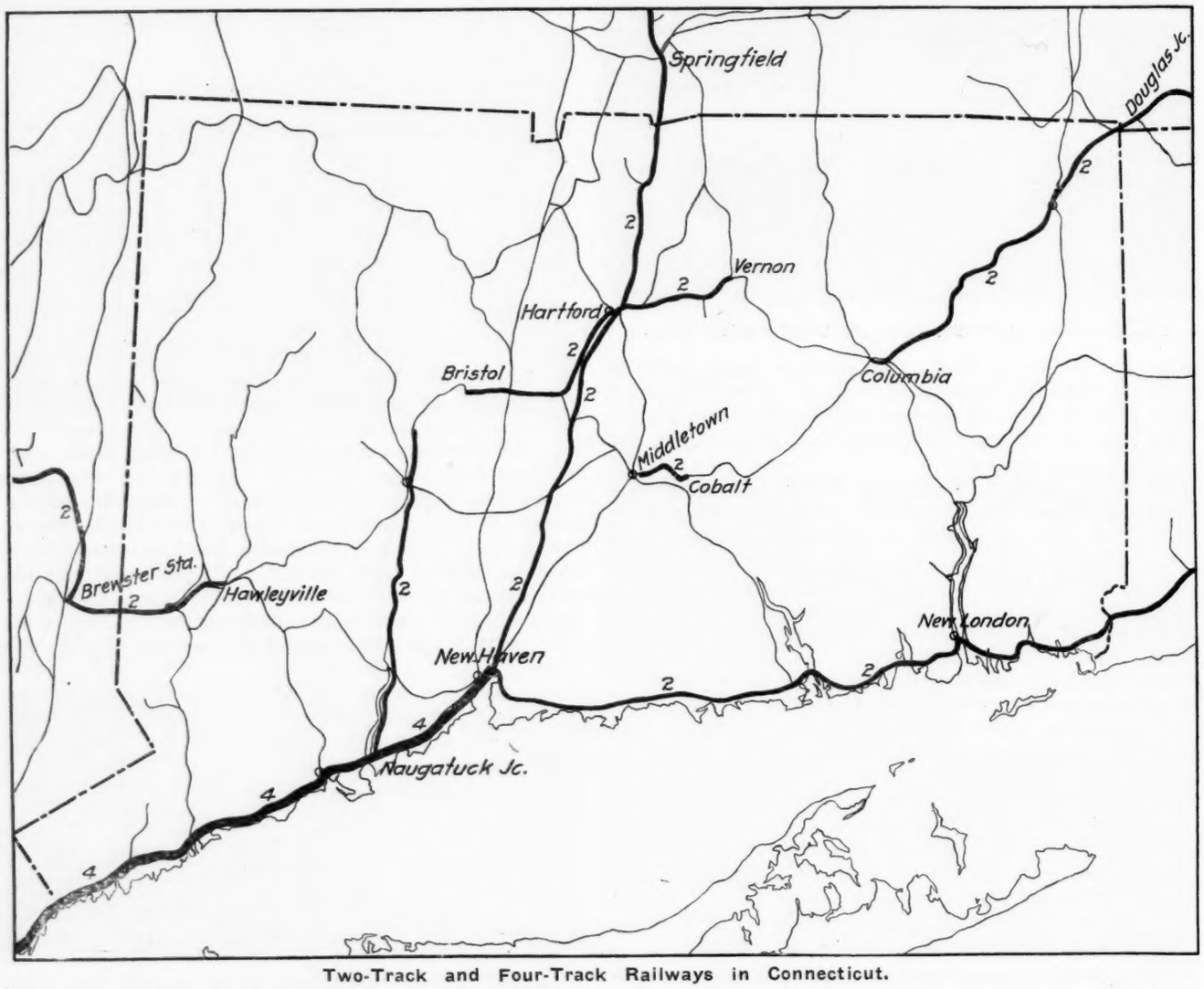
As might have been expected, failure came generally at the ends, where the finishing of the pile by filling concrete into the irregular space between the folds of the wire netting leaves unfavorable conditions for strength. It is evident, then, that the failures at the end are not representative of the full strength of the pile. In the three cases where the failed end was cut off, the second test, 7A, 9A and 10A, gave materially higher results, and where the second end was cut off, 7B, the test shows a still higher value and the pile broke near the end. The pile which broke away from the end, 10A, 3 ft. from the top, gave a strength of 2,570 lbs. per square inch. One pile, No. 6, not given in the table, had been broken in three places in handling, but it carried a load of 156,000 lbs. and failed by shattering at the bottom of the concrete. It will be seen that the piles in which the original end had been removed carried high loads and that there was no indication of lack of uniformity of concrete throughout the length of the piece. In fact, the appearance of the concrete and the action of the piles during test were those of dense and uniform concrete. It would seem that the method of fabricating these under pressure gives the uniformity which is to be desired. So far as the possible weakness of the ends is concerned, it must be borne in mind that the lower point is in the ground and that with the type of construction described by Mr. Cartlidge the upper end may be cut off, or, at any rate, embedded in the concrete cap where it will be protected from lateral failure.

Mr. Cartlidge, in reply to an inquiry, said the trestles were designed for a maximum load of from 25 to 30 tons per pile.

C. R. Dart (bridge engineer, Chicago Sanitary District) said that the Sanitary District last year drove 80 rolled concrete piles, 16 in. in diameter and 35 ft. long, in tough clay without injury to any pile. They were driven from 46 to 60 days after manufacture and none was injured in loading, transportation or unloading. Wooden piles driven in the same ground were, in many instances, badly split.

TWO-TRACK AND FOUR-TRACK LINES IN CONNECTICUT.

In the map published herewith, following those of other states printed in previous issues, we show the location of those sections of railway in Connecticut on which there are two or more main tracks. Four-track railways are distinguished from two-track by the added thickness of the lines in the drawing.



Two-Track and Four-Track Railways in Connecticut.

The termini of the several sections of two-track and four-track line are as follows:

CONNECTICUT.

New York, New Haven & Hartford.

	No. of tracks.	Approximate miles.
Portchester, N. Y., to New Haven, Conn.	4	47
New Haven, Conn., to Rhode Island line	2	69
Brewster, N. Y., to Hawleyville, Conn.	2	16
Naugatuck Junction, Conn., to Summit, Conn.	2	33
Bristol, Conn., to Vernon, Conn.	2	30
New Haven, Conn., to Springfield, Mass.	2	62
Middletown, Conn., to Cobalt, Conn.	2	6
Columbia, Conn., to Douglas Junction, Mass.	2	44

WHEELING & LAKE ERIE COAL TESTS.

Under the supervision of J. E. O'Hearne, master mechanic of the Wheeling & Lake Erie, at Norwalk, Ohio, a number of tests of run-of-mine and ¾-in. lump-and-nut coal were recently made to determine the economy in using each grade. The most recent tests, the complete report of which is given herewith, were made in passenger service, and every possible endeavor was made to have the same conditions during each test. The same locomotive and crew were used over identical runs, covering a total of 2,262 miles. Practically the same weight of train was hauled at the same rate of speed and the results should, therefore, be directly comparable. These conditions were provided after a number of former tests, the results of which were not entirely satisfactory on acount of the varying conditions. Notwithstanding the fact that the price of lump-and-nut coal was $1.10 at the mines and run-of-mine was $1.04, the former shows better results in every instance.

SUMMARY OF RESULTS.

Run-of-Mine Coal.

Car No.	Lump.	Nut and slack.	Total.	Percentage of lump to total.
40962	57,700	30,300	88,000	65.5
11846	30,300	24,400	54,700	55.3
40893	53,000	33,400	86,400	61.3
11157	33,200	18,800	52,000	63.8
9299	29,700	24,300	54,000	55.0
9932	35,200	19,800	55,000	64.0
Totals	239,100	151,000	390,100	61.2

Lump-and-Nut Coal.

Card No.	Lump.	Nut.	Total.	Percentage of lump to total.
8928	43,300	8,900	52,200	82.9
9225	44,600	9,700	54,300	82.1
9336	43,900	9,500	53,400	82.2
9919	45,200	5,900	51,100	88.4
Totals	177,000	34,000	211,000	83.8

Three samples from cars containing run-of-mine coal and three samples from cars containing lump-and-nut coal were taken.

Analysis of these samples were made by Crowell & Murray, Cleveland, Ohio. The results are shown in the following tables:

Kind of coal.	Run-of-mine			Lump-and-nut			Averages Run-of-mine.	Averages Lump-and-nut.
Sample Nos.	1	2	3	4	5	6		
Moisture	2.65	2.95	3.22	.48	.94	.91	2.94	.78
Volatile matter.	41.53	39.51	38.49	43.33	42.91	42.79	39.84	43.01
Fixed carbon	47.81	49.73	49.39	50.22	49.81	49.78	48.97	49.93
Ash	10.66	10.76	12.12	6.45	7.28	7.43	11.18	7.05
Sulphur	4.22	4.24	3.73	4.27	4.89	4.53	4.06	4.56
B.t.u. dry coal.	13,216	13,292	12,905	13,924	13,658	13,520	13,137	13,701
B. t. u. coal as fired	12,866	12,990	12,490	13,857	13,530	13,397	12,782	13,595

The quality of coal was usual for the grade and district. No preparation was given the coal. Large lumps were broken by the fireman as needed and in general lumps were reduced to about one pound in weight before firing. The same fireman made each trip.

With the exception of four trips during the run-of-mine tests and one trip during the lump-and-nut tests, the same engineer made all trips.

The principal items logged during the tests are shown compared in the following statement:

Item.	Run-of-mine.	Lump-and-nut.
Date of tests	Dec. 14-Jan. 4	Jan. 17-Feb. 5
Train service	Passenger	Passenger
Train numbers	2 and 5	2 and 5
Locomotive number	2002	2002
Initial stations	Brewster, Rook	Brewtser, Rook
Destination stations	Rook, Brewster	Rook, Brewster
Train mileage	2262	2262
Engineer	W. C. Jones	W. C. Jones
Fireman	G. M. Basht	G. M. Basht
Recorder	F. P. Pfahler	F. P. Pfahler
Total time on trips	102:22	103:34½
Schedule time of trips	97:50	97:50
Number of intermediate stops	525	508
Time on trips standing still	26:55	28:19½
Time on trips in motion	75:27	75:15
Average speed	22.09	21.83
Average running speed	29.98	30.06
Total number of cars handled	95	91
Number of dead-head cars	5	0
Number of paying cars	90	91
Actual tonnage of cars	47689.50	46057.70
Number of car-miles	10679.4	10292.1
Number of actual ton-miles	537300.01	520904.67
Lbs. of coal fired on trips	192,997	171,913
Lbs. of dry ash and clinker accumulated on grates and in ash pans during trips	24,708	20,217
Lbs. of dry cinders in smokebox	2,151	1,826
Percentage of dry ash and clinker to total coal fired	12.38	11.32
Percentage of dry cinders in smokebox to coal fired	1.07	1.02
Lbs. coal fired per sq. ft. of grate area per trip-hour	43.16	37.98
Lbs. coal consumed per train-mile	85.31	76.08
Lbs. coal consumed per car-mile	18.07	16.70
Lbs. coal consumed per 100 ton-miles	35.919	33.00
Number of times fire cleaned	0	0
Number of times fire raked	0	0
Number of times grates shaken	48	36
Number of times ash pan cleaned	0	0
Maximum boiler pressure-lbs.	190	190
Minimum boiler pressure-lbs.	135	170
Average boiler pressure-lbs.	183	186
Times injector applied	609	568
Times pop valves released	220	274
Average temp. tender tank feed water, deg. Fahr.	37.74	41.53
Average temp. of atmosphere	29.34	42.91
Average barometer, in.	29.04	28.79
Lbs. water consumed in boiler	1,180,631	1,110,272
Lbs. water evaporated per lb. coal.	6.117	6.458
Equivalent evap. from and at 212 deg. Fahr.	7.5318	7.9536

The lump-and-nut coal shows superior results to the run-of-mine in every instance. During January, 1910, the price of run-of-mine coal at the mines was $1.04 per ton; and the price of lump-and-nut coal was $1.10. Reducing the results obtained to dollars and cents, the comparisons are as follows:

Item.	Run-of-mine.	Lump-and-nut.	In favor of lump-and-nut.
Total coal used	$100.35	$94.55	$5.80
Cost coal per train-mile	.0443	.0418	.0025
Cost coal per 100 ton-miles.	.01867	.01815	.00052

A number of roads, as well as the U. S. Government, are now buying fuel on a British thermal unit basis. Assuming that the run-of-mine coal, which shows an average of 12,872 B.t.u. per lb., as sampled, is worth $1.04, the lump-and-nut coal, which contains 13,595 B.t.u. per lb., as sampled, would be worth, on the same basis, $1.098 or practically as billed.

If the evaporation, form and at 212 deg. Fahr., be taken as a basis, the increase in favor of lump-and-nut is 5.6 per cent., and this increase applied to the price per ton would make the lump-and-nut coal worth $1.098 per ton.

From the results obtained, it developed that it would require 5.6 per cent. more run-of-mine coal than lump-and-nut coal due to the same amount of work. In 1909 there was handled 343,743 tons of coal at a cost of $8,805.69. An increase of 5.6 per cent. would necessitate the handling of 19,249.6 tons additional and the cost for the handling coal for the year in the amount of $493.11.

The coal handled at the principal coaling stations during 1909, the haul in miles and the ton-miles are set forth in the following statement. The haul is figured as originating at Pine Valley except Zanesville and Coshocton where it is figured as originating at Warwick mine, four miles east of Coshocton:

Station.	Tons handled.	Haul in miles.	Ton-miles.
Ironville	44,529	193.8	8,629,720
Norwalk	44,130	135.8	5,922,854
Brewster	35,589	65.0	2,313,285
Columbia	52,516	68.0	3,571,088
Pine Valley	49,427	.....	.....
Mingo Junction	15,459	15.3	236,522
Huron	8,835	146.5	1,294,327
Cleveland	39,052	134.4	5,248,588
Canton	40,025	76.0	3,041,900
Zanesville	9,093	25.3	230,052
Coshocton	1,875	4.0	7,500
Total	340,530	89.5	30,495,836

An increase of 5.6 per cent. in the ton-miles would amount to 1,707,766 miles. The cost of moving one ton one mile is estimated at 3 mills, and the cost due to the increased ton-miles would amount to $5,123.30.

There are two items not covered in the report to which attention should be called. One of them is the increased amount of fire thrown from the stack when using run-of-mine coal. While it is impossible to measure this, the increase over lump-and-nut is very great, and hazard of fire damage along right-of-way correspondingly greater. The other item is the damage to ash pans due to small particles of coal

falling through grates and becoming ignited in the ash pans. The damage due to fire in ash pans can only be estimated, but a 50 per cent. increase in ash pan work would very probably result from the use of run-of-mine coal. As ash pan repairs and renewals on this road now reach $7,000 per annum, a 50 per cent. increase in repairs would mean an additional $3,500.

To contain the 19,249.6 tons additional which would be required if run-of-mine were used, would require 481 cars, based on 40 tons per car. Assuming that the period required per car from the time car is placed at mine until it has been unloaded and moved to mine empty is 6 days, the per diem on additional cars would be 2,886. At 50 cents per diem it would be a charge of $1.443 from this source.

As the cost for fuel per 100 engine-miles is 25.6 cents less for the lump-and-nut than for the run-of-mine, the saving from this item (engine-miles in 1909 being 4,804,581) would be $12,299.52.

To sum up by the use of lump-and-nut coal the savings are:

First cost of fuel based on saving of 25.6 cts. per 100 engine-miles	$12,299.52
Saving in transportation of 1,707,766 ton-miles at 3 mills ea.	5,123.30
Saving in ash-pan repairs	3,500.00
Saving in cost of handling fuel	493.11
Saving of per diem on additional cars necessary to handle increased amount of run-of-mine coal	1,443.00
Loss in revenue from 19,249.6 tons coal, assume cost at 74.56 per cent. of 57.76 cts.—loss, 14.7 cts. per ton	2,829.69
Total loss due to use of run-of-mine coal	$25,688.62

No charge for switching has been added to these figures. No loss of revenue due to withdrawal from revenue service of the 2,992 car days necessary to transport additional run-of-mine fuel has been considered. There should be considered, also, the decreased hazard of fire damage, which, while it cannot be estimated, greatly favors the lump-and-nut coal.

INSTRUCTIONS FOR MAKING LOCOMOTIVE FUEL TESTS OF RUN-OF-MINE AND THREE-QUARTER GRADES OF COAL.

1. Both grades of coal should come from the same mine and care should be taken to see that each is of proper preparation for the grade, but that no special preparation is made.

2. A locomotive carrying 200 lbs. working steam pressure in first-class, tight and clean condition and adjustment with respect to ash-pan and dampers; rocking and drop-grates; firebox; flues; boiler; dry, steam and exhaust pipes; throttle valve; steam-blower; smokebox and stack draft appliances; piston or slide valves; motion gear and cylinder and rod packing should be selected for use throughout the test. All special equipment such as steam gage, water gage, try cock, lubricator, pop valve, injector and like devices should be tested to see that they are in good working order and record correctly before the test is commenced.

3. The grates, smokebox draft appliances and exhaust nozzle opening should be adapted and adjusted to suit the grade of coal to be tested.

4. The test should be made in passenger train service on account of the more uniform conditions and the less time required to complete a given number of trips, as compared with freight train service.

5. The fastest and heaviest trains of nearly uniform conditions and weight, day in and day out, should be selected. If necessary and practicable, deadhead equipment should be added to obtain similar conditions.

6. Not less than 10 round trips or 4,000 miles should be run with each grade of coal to be tested.

7. The same engineer and fireman should be retained throughout the test of both grades of fuel.

8. The tender tank water should be gaged in the usual manner at the start and finish of each train run, also before and after taking water at intermediate water supply stations. A record should be kept of the number of injector applications, as well as of the number of times the pop valves relieve during each trip, to determine the waste of water and steam, respectively, due to those causes.

9. Portable scales should be provided on the coaling tipples to allow weighing the coal in 300 or 400-lb. lots in a box placed on the scales, before the coal is dumped into the tipple pockets.

10. None of the weighed coal shall be used in preparing the fire at the engine house nor until the locomotive starts on its trip with the train. At the finish of the train trip, the coal remaining on the tender should be weighed out accurately with hand scales to determine the actual weight of coal used.

11. The depth and condition of the fire in the grates; the water level in the boiler and the steam pressure should be uniform at the start and finish of each train-trip to avoid the necessity for making adjustment in the weight of coal and water actually consumed on the trip.

12. A record should be kept of the steam pressure and gages of water in the boiler on leaving the initial terminal, on arriving at and departing from the principal stops, and on arriving at the destination terminal. Also for each 10-min. interval while running. The position of the throttle and reverse levers should also be recorded at the same time.

13. The following instructions should be complied with so far as practicable:

Before the commencement of a test-trip, the rocking and drop-grates, ash-pan dampers, ash-pan slides and steam jets, and grate and ash-pan operating gear should be examined and tested to see that all grates set level when latched and that all parts are in good working and in proper position. The smokebox and ash-pan should be clean and the smoke-stack and ash-pan steam blowers in good order. All necessary fire tools must be on the locomotive. The fire must be put in good condition on the grates by spreading and replenishing with fresh fuel, in small quantities at a time, until properly built up preparatory to starting with a full supply of water and steam in the boiler. Lumps of coal should be broken to as near the size of a man's fist as consistent before putting into the firebox. A thin clean fire should be maintained so that the fuel can be supplied with sufficient air through the grates for proper combustion, and produce a clear bright flame. Cross-firing should be practised to maintain an even bed, free from holes, and localized heavy or lumpy firing should be avoided. The use of the rake and "puddling" of the fire should be resorted to only when absolutely necessary to spread an uneven fire caused by uneven draft or improper firing. The banking of green fuel at the furnace doors should be restricted.

The grates should be kept well supplied with coal at the sides, ends and corners of the firebox, and not more than two or three shovelfuls, each scattering the coal, should be supplied at one time. Heavy intermittent firing should be avoided. Only sufficient fire should be kept on the grates as is necessary to prevent loss of heat on account of cold air passing through the grates so freely as to reduce the temperature of the gases, and to suit the way the locomotive is being operated.

Injectors and reverse and throttle levers should be operated to favor the firing when starting from a station and on heavy pulls. The smoke-stack blower should be used when necessary to prevent reduction in boiler pressure and the boiler feed should be increased to prevent release of steam through the pop valves.

Rocking grates must be shaken lightly and frequently, instead of violently at long intermittent periods, and, if possible, when steam is shut off. As a general rule, all rocking grates on passenger locomotives should be shaken every 30 miles. This practice will break any clinker that may be forming over or hardening between the grate openings and will allow dead ashes to fall into the ash-pans and keep the grates and fire clean. It will also allow the air to pass through the grates and fire and prevent the formation of clinker on the firebox flue and crown sheets, which occurs when air cannot get through the grates and must pass over the fire.

The practice of opening the furnace door unnecessarily should be avoided. When locomotives are drifting, the fires must be maintained in a clean and bright condition over the entire grate area, more especially at the flue sheet.

General News Section.

D. W. Bigoney, treasurer of the Erie Railroad, has received from Philadelphia $1,000 in conscience money.

On the night of April 19 at Clinton, Ind., two piers of the bridge of the Chicago & Eastern Illinois over the Wabash river were badly damaged by dynamite.

The Safety Appliance law, which has been passed by Congress and which was printed in the *Railway Age Gazette* last week, page 982, was signed by President Taft on April 14.

The Berkshire Street Railway Company, operating street and interurban lines in western Massachusetts, has offered prizes of $10, $5, $3 and $2 for the best displays of flowers along the lines of the company.

The gangs at work on new railways near Spokane, Wash., now aggregate an estimated number of 4,000, and the contractors are looking for 2,000 more. The scarcity of men is such that laborers are now being paid $2.50 a day; track layers, $2.50 to $2.75.

The reports of all baseball games played by the American, National and Western leagues will be sent by telegraph each day to three of the Rock Island's fast passenger trains, the Rocky Mountain Limited, the Golden State Limited and the Chicago-Kansas City Limited, and will be posted in the library cars.

The Attorney-General of Kentucky has given an opinion that the tax to be imposed by the state of Kentucky on the franchise of the Southern Pacific Company, which is incorporated in that state, should be calculated on a valuation of $5,000,000, instead of ten millions, as fixed by the State Board of Assessors.

At Lake Macdonald, near Kakoucache, Quebec, on Monday last a work train, engaged in the construction of the Transcontinental Railway, fell through a trestle 90 ft. high, and a large gang of men on the train fell into the lake at a point where it is 20 ft. deep. Ten men were killed and 23 injured, six of them fatally.

The eastbound mail train of the Southern Pacific was stopped by robbers last Saturday night two miles east of Benicia, Cal., and five bags of registered mail taken from the mail car. The robbers had crawled on to the tender while the train was crossing the ferry and subdued the engineman and fireman with pistols.

Near Altoona, Pa., recently, according to a press despatch, a track foreman of the Pennsylvania, who was walking on the tracks while off duty, was arrested and sentenced to ten days in jail. At about the same time one of the men belonging to this foreman's gang was walking on the track, when off duty, and was run over by a train and killed.

An officer of the Burlington says that the reports that this road will run through trains between Chicago and San Francisco in connection with the Denver & Rio Grande and the Western Pacific are without foundation. They seem to have grown wholly out of the fact that President Miller, of the Burlington, on a western trip rode over the Western Pacific.

The work of valuing all railway property in the state of New Jersey, begun last year under a commission of three, and interrupted recently because of discussions in the legislature concerning the expediency of appropriating further money for the work, is to be continued under the direction of Charles Hansel, acting under the State Board of Assessors. The legislature has appropriated $50,000 for the work.

From present indications the output of the Mount Clare shops of the Baltimore & Ohio for the month of April will be the largest in their history, even exceeding the record for March, when 45 locomotives underwent heavy repairs. About 2,200 men are employed at these shops, 1,600 of them being in the locomotive department. The steady increase of traffic on the system has necessitated a great deal of overtime work in order to keep the car and engines in condition. Mount Clare is the principal shop of the Baltimore & Ohio, and most of the heavy repair work and rebuilding of equipment is done there.

Vice-President Schumacker, of the Western Pacific, is appointing officers in the traffic department preparatory to opening the road for passenger business. The date for starting regular passenger trains is still uncertain because of difficulty in securing a sufficient number of men to repair the damage done to the road by high water at Great Salt Lake, Utah. Eight steel dining cars have been delivered to the road.

Mayor Kreisman has invited the presidents of the 14 railways composing the Terminal Railroad Association of St. Louis to meet with a joint committee of the municipal assembly and a committee representing the shippers of St. Louis at the Mercantile Club at 12:30 p. m. on April 27. The purpose of the conference is to consider the question of the abolition of bridge arbitraries at St. Louis.

E. P. Griffith, superintendent of telegraph of the Erie; J. C. Johnson, of the Pennsylvania, and C. M. Lewis, of the Philadelphia & Reading, acting as a committee of the Association of Railway Telegraph Superintendents, have undertaken to formulate regulations, in conjunction with the telegraph companies, by which receipts will be returned to the telegraph companies for telegrams delivered to passengers on trains.

The Nebraska Railway Commission is sending a circular letter to the railway commissions of other states, asking them to join it in petitioning President Taft not to appoint anyone who has been a railway attorney to succeed the late Justice Brewer on the United States Supreme Court. It looks as if this move is aimed directly at Lloyd W. Bowers, solicitor general of the United States, who, previous to his appointment to this office, was general counsel of the Chicago & North Western.

A correspondent, F. W. S., noting our reference last week to a luncheon as an alternative to the five-course dinner on certain dining cars, suggests that the buffet smokers of certain of the always-crowded trains might be made to serve as luncheon annexes to the dining cars. This would obviate much of the unpleasant waiting and would accommodate a portion of the passengers without detriment to the interests of the railway. Two or three sandwiches, a bottle of beer and a cigar would aggregate an expense not so far from the price of the table d'hote dinner and would suit some people even better than the full course dinner, quite aside from the matter of expense. Why not apply this to the Congressional Limited of the Pennsylvania road and the Merchants' Limited of the New Haven?

Governor Haskell of Oklahoma has issued a call for a special election to be held on June 11 at which there will be submitted to the people of the state a proposition to amend the provision of the state constitution which forbids consolidation of transmission and transportation companies in Oklahoma with similar companies in other states either by private or judicial sale. The proposed amendment gives express authority for consolidations such as are now prohibited and also grants to existing railways the right to extend their lines in the states without perpetuating the state organization for the construction and management of such extensions. The existing companies are also, whether local or foreign in their nature, to be given the right to exercise the power of eminent domain.

After the state's attorney of Cook county, Ill. (Chicago), refused to prosecute Benjamin Thomas, John C. Fetzer and Charles R. Kappes for alleged frauds against the Chicago & Western Indiana in the purchase of real estate, these persons and the directors of the road agreed to submit the question of whether frauds had been perpetrated, and of their extent, to arbitration by E. C. Field, vice-president and general solicitor of the Chicago, Indianapolis & Louisville. Mr. Field has rendered a report holding that Messrs. Thomas, Fetzer and Kappes should turn over to the Chicago & Western Indiana

$525,000. The directors of the Chicago & Western Indiana had alleged in a civil suit brought at Chicago by them and in evidence they furnished to the state's attorney that frauds had been committted amounting to $800,000. It is stated that Messrs. Thomas, Fetzer and Kappes will refuse to settle on the basis fixed by Mr. Field. In that event the civil proceedings against them will be pushed.

The Chicago & North Western is now using five oil-burning locomotives on its line from Chadron, Neb., to Lander, Wyo. There is an oil field in the vicinity of Lander in which about 30 wells have been bored and which is producing about 200 barrels of oil a day. Two or three new wells are being put down each week, and it is expected that the total number will reach 60 or 70 and that they will have a capacity of 400 to 500 barrels a day. The oil is of satisfactory quality. It is probable that the North Western will convert other coal-burning into oil-burning locomotives for use in this territory. The road is also running two engines between Casper and Lander with lignite coal, of which there are large deposits around Lander. It is being supplied from two mines, one at Lost Springs, Wyo., and the other at Inez. An officer of the road says that after considerable experimenting these engines have been so well adapted to the burning of lignite coal that the number and size of the sparks thrown out by them have been reduced to a point where the burning of such coal has become entirely safe.

The Blue Island Rolling Mill & Car Company has brought suit at Chicago against the Illinois Central for $35,000, which, it is alleged, the road owes it for repairs to its cars and for bar iron furnished to it. The suit is understood to be more or less directly connected with an investigation which Detective W. J. Burns has been making for President Harahan of alleged "grafting" in the repair of cars. The Chicago newspapers have printed a great many reports about the alleged "graft," but the officers of the Illinois Central have refused to confirm or deny any of these reports. President Harahan states, however, that Detective Burns has been investigating the matter of repairs of cars made by outside companies. He said on April 18 that until the investigation is finished he will not make any further statement in regard to it. It is understood that Detective Burns has made his final report to Mr. Harahan. The reports regarding the entire matter are very vague, but the understanding is that Mr. Harahan suspects that certain companies which nave been repairing the road's cars have been paid excessive prices for the service and that some persons who have been connected with the road have profited more or less thereby. Pending the investigation settlements of the Illinois Central's accounts for car repairs with various outside companies have been delayed. It is reported that the bills for 1909 of the American Car & Foundry Company and the Kankakee Car Company have been found correct.

Free Relief for U. S. Steel Employees.

E. H. Gary, chairman of the board of directors of the United States Steel Corporation, has announced the adoption of a plan of relief for employees injured at their work, and promises an early announcement of a plan for pensioning disabled and superannuated employees. The statement says:

This is a purely voluntary provision for injured men and their families, made by the companies without any contribution whatsoever from the men. In principle it is similar to the laws in force in Germany and other countries and to recommendations which have been made by the Employers' Liability Commission of New York and other states since our work upon this plan was begun.

Under this plan relief will be paid for temporary disablement and for permanent injuries and for death. The relief is greater for married men than for single men and increases according to the number of children and length of service. During temporary disablement single men receive 35 per cent. of their wages and married men 50 per cent., with an additional 5 per cent. for each child under sixteen and 2 per cent. for each year of service above five years.

For permanent injuries lump sum payments are provided, based on the extent to which each injury interferes with employment and upon the annual earnings of the men injured. In case men are killed in work accidents, their widows and children will receive one and one-half years' wages, with an additional 10 per cent. for each child under sixteen and 3 per cent. for each year of service of the deceased above five years.

For some years the subsidiary companies of the United States Steel Corporation have been making payments to men injured and families of men killed in practically all cases, without regard to legal liability. These payments have amounted to more than $1,000,000 a year, but it is believed that the plan now adopted will result in additional benefits. * * * All men are to receive the relief, even though there be no legal liability to pay them anything, which is the case in at least 75 per cent. of all work accidents. [Acceptance of a payment estops the recipient from claiming further damages and one who intends to sue for damages will, of course, take care not to accept the proffered gift.]

Experience will perhaps lead to some modifications of this plan, but it will be in operation for one year from May 1, 1910, and if it meets with success and approval from the men and the public, it is hoped that similar and possibly improved plans may be adopted in succeeding years.

Negotiations Concerning Wages.

E. E. Clark and P. H. Morrissey are sitting in New York this week as arbitrators in the questions concerning wages which have been referred to them by the New York Central and the committees of conductors and trainmen of that road. Representatives of the employees of the Boston & Albany are present at these hearings, and also delegates from the Lake Shore, the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis and other central lines.

On Sunday last the Delaware, Lackawanna & Western announced that an agreement had been reached with representatives of the conductors and brakemen's brotherhoods to refer their controversies concerning wages to Messrs. Clark and Morrissey, that is to say, an agreement had been reached by which the officers of the Lackawanna and the representatives of its employees should be present at the hearings given by Messrs. Clark and Morrissey in the New York Central controversy, with a view to accepting their decision as binding on the Lackawanna the same as on the Central. This announcement followed a conference at Scranton Sunday evening, which, it is said, was the result of the announcement by the leaders of the Lackawanna employees that an order had already been sent out directing the men of these classes to strike throughout the lines of the company at 11:45 p. m. The strike order was rescinded at 9:30 p. m. On Saturday the officers of the brotherhoods had refused to accept the Lackawanna offer of a general increase of 6 per cent. and had sent out a circular alleging unfair treatment on the part of the railway company's officers. The despatches indicated that the enginemen and firemen were in constant consultation with the other brotherhood leaders and that these classes also would strike. The circular of Saturday asserted that the company had refused decent recognition of just demands; had been constantly trying to evade the issue and divide the men; had deferred conferences and refused to rectify evils; all with the purpose of imposing lower rates and less desirable conditions than prevailed on other roads. The officers of the company declare that they had offered to submit all questions to arbitration in a regular manner, but that they could not accede to the demand of the men that the New York Central arbitration should be accepted before it was known what the result of that arbitration would be.

The claims of the brotherhoods on all the roads north of the Pennsylvania—the New York Central, the Lackawanna, the Lehigh Valley and the Erie—have been based largely on the allegation that the rates were not uniform, were higher on some parts of a road than on other parts; but the fact seems to be that on all of these roads the rates generally have been for years less per mile than those on the Pennsylvania, while on the Baltimore & Ohio they have been substantially the same as on the Pennsylvania.

Representatives of the principal employees' brotherhoods are holding conferences at Albany with officers of the Delaware & Hudson. On Monday the representatives of these employees gave to the newspapers statements which were inter-

preted as threatening a strike of all the brotherhoods on the road, but no official statement justifies this interpretation.

The Lehigh Valley last week agreed with committees of its trainmen to increases in pay, dating from April 1, which are said to be as follows: Trainmen, passenger, from $2.10 a day to $2.25; baggage men, $2.20 to $2.35; trainmen, freight, $2.20 to $2.30; trainmen, local freight, $2.50 to $2.70; switchmen, 30 cents a day increase for all classes. Trainmen will receive extra pay for trips of over 10 hours; heretofore extra pay has not been allowed until after 12 hours.

The Baltimore & Ohio has made increases in the pay of its firemen which average 5½ to 6 per cent. On large passenger engines the rate is increased from 2.3 cents a mile to 2.4 cents a mile; on small engines from 2.2 to 2.3; on engines (freight) weighing 70 tons and over the rate has been increased from 2.80 cents to 2.95 cents. The increases to firemen in yards are from $2.40 to $2.55 a day; from 2.35 to $2.45, and from $2.30 to $2.40.

Press despatches from Boston April 17 report a strike of 400 track laborers, begun apparently by men employed on temporary work.

The Norfolk & Western has made an increase of 6 per cent. in wages of conductors.

The Chesapeake & Ohio, following conferences with representatives of the employees, has promised an important increase in wages. According to one report the principal classes of employees will receive an advance of over 9 per cent.

The New York, New Haven & Hartford has granted an increase of 20 cents a day to track foremen.

The Norfolk & Western has made an increase of 6 per cent. in the pay of trainmen and yardmen.

Railway Business Association Before Ohio Senate Committee

As noted in our issue of last week, page 1021, the Railway Business Association organized a demonstration at a hearing at Columbus, Ohio, on April 12, protesting against the passage by the senate of the Woods public utilities bill. Among the speakers were A. M. Kittredge, president of the Barney & Smith Car Co., Dayton, Ohio, and S. P. Bush, president of the Buckeye Steel Castings Co., Columbus, Ohio.

Mr. Kittredge said that those for whom he spoke had come to appear before the committee because they felt that the legislature of Ohio was in danger of making a mistake which would prove disastrous to many industries. They came in an entirely friendly attitude. They believed that the legislature desired to serve the people of the state well. They believed, however, that the Woods bill is a striking example of the mental dyspepsia that results from trying to do too much in too short a time with no opportunity properly to study the underlying facts. Those who manage large business enterprises realize that the difference between profit and loss is purely a matter of prudence in administration. They are prone, therefore, to ponder long over proposed changes in methods and they feel the legislature should do likewise. There were in the room at that moment, he said, men who do more business with the railways of Ohio, ship more freight, pay more freight bills, buy more transportation of all kinds in a month than that of all the members of the Ohio legislature put together for the past score years. They have their differences with the railways; sometimes sharp and acrimonious. Are they here to demand that the management of the railways be taken out of the hands of those who are trained to railway operation? No. They are here to say that before you enact a law drastic in its provisions, radical in its changes of business methods, costly in its enforcement not only to the state but to the railways, each member of the general assembly should be dead sure that you know what you are doing, why you are doing it, and that it is the consensus of public opinion that it is necessary.

"In order that I may qualify as one who knows something about freight rates, I would say that the Barney & Smith Car Co. of Dayton, with which I am officially connected, pays freight bills in years of normal activity of at least $600,000."

Mr. Kittredge said that 96 business houses of Dayton had signed a petition urging the utmost conservatism in dealing with the Woods bill. The Railway Business Association had sought to find if there is among the shippers of Ohio any grievance properly coming within the purview of the Railway Commission as now constituted that it has not taken cognizance of and does not possess power to cope with. It had been unable to find any.

Mr. Bush said that the group of interests represented by the Railway Business Association employs in good times throughout all the states about 1,500,000 men. In Ohio members of the association have about 800 establishments employing between 100,000 and 150,000 men. Whatever hurt the railways hurts them more, for the railway executive cannot be expected to plan and make betterments at a time when, by reason of pending measures, there is uncertainty as to the revenue he will be permitted to earn or the expenditures he will be compelled to make. There has been abuse of privilege from time to time, but, as laws have been enacted to correct and prevent them, the fundamental principle of freedom of individual initiative has been maintained. Of late, however, there has been observed a tendency to depart from this principle, a tendency which is illustrated by the Woods bill.

"Fortunately, when we urge that railways be fostered and not assailed," Mr. Bush continued, "we request what is in the public interest. If Ohio has laws which make it difficult for the carriers to render efficient service, and with profit, then her industries will sooner or later suffer in competition with the industries located in states which pursue a policy of encouragement to railways.

"We do not suppose for a moment that the gentleman who drew this bill or any of his colleagues who voted for it would knowingly injure the people and industries of the state, but we desire to emphasize that great injury may be done them if any mistake is made in the method used for the regulation of the railways.

"I say specifically the method proposed in this measure of making the government a partner in the management with powers much greater than heretofore deemed wise or necessary, is a new and untried one in this country and in my own humble judgment calculated to suppress that vigor and initiative which has characterized the wonderful railway and all other development of the entire country."

Railway Matters in Washington.

Washington, April 20, 1910.

The railway bill has made little progress in Congress during the past week, having been laid aside in the Senate on Friday last to allow consideration of the river and harbor bill.

There has been considerable discussion in the House, but no action of importance. Representative Mann thinks that the amendments can be passed on, and the bill brought to a vote, within two or three weeks. Anything like agreement in the action of the two houses seems to be considered hopeless, so that the last stage of the matter will be a series of protracted discussions by a conference committee.

The Maryland Public Utilities Law.

The new corporation law of Maryland was reported in the *Railway Age Gazette* April 15, page 1005. This law appears to be as full and detailed as that of New York. In addition to the features given in the report last week, the following are the principal provisions:

"Uniform systems of accounts may be required if the commission sees fit. Control over the issuance of new franchises or privileges and over the transfer of franchises is vested in the commission. The corporations subject to the act may, with the consent of the commission, issue stocks, bonds or other securities, payable more than 12 months after date, when necessary to acquire property or for the construction, completion, extension or improvement of their facilities, or for the improvement or maintenance of their service, or the discharge or lawful refunding of their obligations. In valuing the property of any public service corporation, such valuation shall be so made that as far as possible it shall not affect the value of bonds heretofore issued.

"The capitalization of merger agreements or franchises of public service corporations and the issuance of stocks is prohibited, except that the amount actually paid for a fran-

chise may be made the basis of capitalization and the issuance of stocks and securities.

"The amount of $75,000 per annum, or so much thereof as may be necessary, is appropriated for the salaries and expenses of the commission and for carrying out the purposes of the act. All acts or parts of acts heretofore passed fixing the rates of any public service corporation are repealed, and the powers of the commission to ascertain rates which are reasonable and just supersede all such acts prescribing rates.

"The repeal of these acts includes the repeal of the existing act fixing the price of gas in Baltimore city at $1.10, and gives the commission full power to reduce it to any figure which may be determined to be just and reasonable."

Japan's Control of Manchuria.

The American government's "neutralization" proposal, following closely on the abortive Fa-ku-men Railway agreement and by China's scheme to construct a line of her own from Chinchau through Tsitsihar to Aigun, illustrates the modus operandi of conquest by railway and its immediate results. The whole history of the South Manchurian Railway, both in Russian and Japanese hands, throws into the clearest relief the immense value for political and economic purposes of a railway concession in the hands of a strong power through territory administered by a weak one.

The present position of affairs in Manchuria clearly foreshadows the extension of Japanese predominance from those thin lines of steel to ever-widening spheres of activity; it shows once more the futility of such polite fictions as the Portsmouth treaty to check the forces of economic pressure; and it reveals in a startling manner the real helplessness of China's central government. Manchuria is dominated, throughout its vast length and breadth, by Russia's and Japan's rights of ownership in the Chinese Eastern Railway as completely as under definite rights of suzerainty, but the effects are more apparent from Harbin southward than in the less-frequented regions of Heilung Chiang. * * * No doubt but that the fate which is slowly but surely separating Manchuria from the Chinese empire is the inevitable result of the law of the survival of the fittest, and that the South Manchurian Railway provides the best and simplest means by which that result was to be attained. The grim facts of "economic gravitation" are beyond dispute as they are beyond remedy, and it were folly to deny their force, treaties and agreements notwithstanding.—*London Times.*

Unloading by Immersion.

The Delaware & Hudson has built at Lake George, N. Y., a marine railway to facilitate the unloading of small vessels from cars direct to the water. A track extends from the shore into deep water, permitting a boat having six feet draught to be floated clear of the cars. Then the cars are hauled out. We trust that this concession to the owners of boats has been duly considered, in regard to its possible importance as a factor in discrimination, by the Interstate Commerce Commission.

Water-Tight Freight-Car Doors.

The transportation department realizing that doors of freight cars are rarely water-tight, has devised a scheme for protecting these openings with strips of odorless water-proof paper. Small wooden wedges are driven between the door and door shoes. This forces the door up against the side of the car and holds it in place. The wedges, paper, wooden strips and nails necessary to equip one car cost about six cents. The water-proof paper used is an asphaltum paper made expressly for this purpose, and the small wooden strips that hold the paper in place and the wooden wedges are made from scrap lumber at the Springfield shops.

To insure against improper cars being loaded with flour or other mill stuff a flour inspection card is used. Car inspectors and agents have been notified that they are not to load a car with flour or other mill products, unless one of these cards is attached to the car. This card shows that the car was inspected and placed in condition for flour loading, and gives the name of the inspector, etc. An agent cannot sign a bill-of-lading for a car of flour unless this flour inspection card was detached from the car and attached to the duplicate bill-of-lading. The flour inspection card scheme has been in force on the Frisco about a year, but the papering and wedging has only been in use since the first of January.—*The Frisco-Man.*

Employers' Liability in France.

According to a report from the Consul-General at Marseilles, the employers' libility law of France, which has been in force 12 years, is now generally recognized as equitable, and the manufacturers are said to be entirely reconciled to it. Under this law there is a long list of fixed indemnities which, it seems, are not varied except in the case of an inexcusable fault, when the amount of damage for an injury may be substantially increased if the fault rests on the employer, or decreased if it rests on the employee. The term "inexcusable fault" seems to mean criminal negligence. The courts have frequently held that drunkenness comes within this definition. For total disability a workman receives a life pension equal to two-thirds of his salary; partial disability, one-half of the reduction in salary resulting from the accident; but if the salary has been relatively high, the pension will be smaller in proportion. During temporary incapacity half pay is allowed. Allowances to widows, in case of a fatal accident, are usually 20 per cent. of the deceased's salary; but in case of remarriage a lump sum is paid, equal to three annuities, and then the pension stops. In addition to the pensions, the employer has to pay the doctor, the apothecary and the undertaker.

Duties of Employer and Employee.

Both employers and employees must change their policies in important respects before we shall reach a final settlement of the industrial problem. The employers cannot hope for industrial peace as long as they demand for themselves privileges of combination which they will not grant to their employees. The employees, on the other hand, cannot expect a relationship between themselves and their employers which is satisfactory so long as they strive to bring about their relationship, not on their merits but by coercing the community to take their part. The pathway to success for them lies in quite a different direction. They ought to encourage all legislation which will make public opinion a direct factor in the settlement of industrial disputes because, so far as their claim is just, public opinion is certain to be on their side so long as their rights are denied.

Beyond this, they must strive to make the regulations of their unions so reasonable that employers, instead of being afraid of them, will turn to them, because through unions they can get better service than in any other way. I have no doubt there are many instances of such unions. I understand how difficult it is to make all unions of this character. I am entirely clear, however, that the labor movement will be strong, in this country, precisely in proportion to its success in doing these things. * * * If that day comes when employers use union labor by preference, it will not be long, then, before all the devices of stock ownership, pension funds and the like, which are now sometimes offered to workmen in order to win them from their unions, will be made available to them because they are members of unions. * * *—*Seth Low, Ex-Mayor of New York.*

Appreciation.

It would be a great thing for Vermont if the better farming special could become a regular train.—*Burlington Free Press.*

African Railways.

German Southwest Africa, which extends on the Atlantic coast from the mouth of the Orange river, about 28 deg. 40 min. south of the equator, northwards to 17 deg. 20 min., has a barren coast, but at some distance in the interior there

is more fertile land, and near the northeastern part some mines of importance. To develop what resources there are it is necessary to get to the interior. This is now done by means of three railways. The first of these extends from Swakopmund, near latitude 23 south, eastward by a circuitous route 237 miles eastward to Windhoek. It was built by the government of 2-ft. gage, and was indispensable, though very imperfect, during the revolt of the natives.

The second line was built by a mining company, also of 2-ft. gage, also beginning at Swakopmund and extending northeastward 352 miles through Otari, the mining center, to Tsumeb, with a branch 57 miles long from Otari eastward to Groatfoutein, and another uniting it with the first named line at Karbib 9 miles long. This was built to serve the mines, but has been acquired by the government, which now purposes to build a north and south line from Windhoek to Otavi, 328 miles, through the interior habitable region, but to make it of the "Cape gage," 3 ft. 6 in., and to change the Swakopmund-Windhoek line to the same gage.

The third line, of 3 ft. 6 in. gage, extends from Lüderitz Bay about 26 deg. 40 min. south nearly due east 227 miles to Keetmanshoop, with a branch 112 miles long from Seeheim to Kalkfontein.

The gage is chosen with the expectation of eventually forming a junction at the Cape railways, none of which, however, are within some hundreds of miles of the German territory, northwestern Cape Colony being, for the most part, barren.

In German East Africa the Usambara Railroad, begun by private enterprise in 1890, but soon taken over by the government, was opened from the sea not far south of British East Africa at different times til this year it reached Buiko, 108 miles. It is now proposed to extend it 107 miles further to Moschi, in the vicinity of Mt. Kilimanjaro, reaching a comparatively temperate and healthy country, capable of cultivation and production. The line is in a manner parallel with the British Uganda Railroad, but a few hundred miles further south. Like it, it is eventually to be extended to Lake Victoria Nyanza, reaching its southern end as the British line does its northern end.

American Railway Engineering and Maintenance of Way Association.

The board of direction of the American Railway Engineering and Maintenance of Way Association has prepared an outline of the work to be done by the various committees during 1910. Aside from the usual first paragraph regarding revision of the manual, each committee is told to make concise recommendations for the next year's work. The other instructions are as follows:

COMMITTEE I.—ROADWAY.

2. Collect all known formulae for determination of size of waterways and tabulate them in such manner that they may be intelligently compared. Also consider whether, by the introduction of factors suiting local conditions, a general formula for waterway areas could not be used in all cases.

3. Unit pressures allowable on the roadbed of different materials.

4. Tunnel construction and ventilation.

5. Investigate and report on the question of agricultural drainage in levee and marsh districts as they affect railways.

(a) Laws and assessments.

(b) Methods of construction of drainage channels through railways.

COMMITTEE II.—BALLAST.

2. Complete physical tests of stone for ballast.

3. Investigate the proper thickness of ballast to insure the uniform distribution of the loads on the roadbed.

4. Review report on gravel ballast and recommend methods for grading the different qualities.

COMMITTEE III.—TIES.

2. Continue compilation of statistics on life of treated and untreated ties. Digest the statistics and present conclusions derived therefrom.

3. Metal, composite and concrete ties.

COMMITTEE IV.—RAIL.

2. Continue the investigation of the breakage and failure of rails and present summary of conclusions drawn from reports received.

3. Report on the results obtained from the use of open-hearth and special alloy steel rails, and chemical composition of such rails.

4. Present reports on the results of tests made in conjunction with the Manufacturers' Committee on the various kinds of rail by means of the special machines at the Pennsylvania Steel Company's mill and the Sparrows Point mill of the Maryland Steel Company.

5. Report on any recommended changes in specifications for steel rails.

6. Present recommendation on standard rail sections.

7. Present report on rail joints, showing results of all tests at Watertown Arsenal, and recommending design and specifications.

8. Reconsider and report any recommended change in standard drilling for rails as given in the manual.

COMMITTEE V.—TRACK.

2. Prepare specifications for frogs, switch points and crossings, including the use of manganese or other special alloys.

3. Track fastenings used with treated ties.

COMMITTEE VI.—BUILDINGS.

2. Reinforced concrete coaling stations.

3. Roof coverings.

4. Tool houses.

COMMITTEE VII.—WOODEN BRIDGES AND TRESTLES.

2. Continue to co-operate with Committee II. of the American Society for Testing Materials and with other associations in the preparation, revision and adoption of uniform standard specifications for structural timber.

3. Continue the study of principles and methods of pile-driving, including information on pile-drivers and equipment, analysis of practical experience in pile-driving, the strength of sheet piles, recommended types of equipment of sheet piles, of concrete piles and of formulae for bearing power.

COMMITTEE VIII.—MASONRY.

2. Report upon the waterproofing of masonry, covering methods, results, cost and recommended practice.

3. Define monolithic construction. Revise report on the durability of all monolithic construction in arches or large abutments with wing walls.

4. Present typical plans of retaining walls and abutments, plain and reinforced, with comparison and recommended practice. This also requires theoretical consideration.

5. Continue investigation and report on the use of reinforced concrete trestles, typical designs and cost.

COMMITTEE IX.—SIGNS, FENCES AND CROSSINGS.

2. Report on ways and means for securing a proper quality of fence wire to resist corrosion and secure durability.

3. Continue investigation of the use of concrete fence posts and submit recommendations.

4. Continue investigation as to the best form of track construction and flange ways at street crossings in paved streets.

COMMITTEE X.—SIGNALS AND INTERLOCKING.

2. Continue investigation of outline and description of a comprehensive and uniform signal system, suitable for general adoption, conferring with proper committee of the American Railway Association on subject.

3. Revise Mechanical Interlocking Specifications presented in Bulletin 108, and include wrought iron pipe as well as steel.

4. Review and resubmit Electric Interlocking Specifications, with statement of the results from experience.

5. Confer with Committee III. on Ties, and make report on the effect of treated and metal ties on track circuits.

6. Confer with Committee on Yards and Terminals in regard to capacity of terminal lay-outs.

COMMITTEE XI.—RECORDS AND ACCOUNTS.

2. Continue study of estimate forms for construction and maintenance work.

3. Recommend form for and system for keeping side-track records.

COMMITTEE XII.—RULES AND ORGANIZATION.

2. Confer with allied committees which have heretofore presented rules which have been adopted by the association with a view of harmonizing all such rules as have been considered by this committee.

COMMITTEE XIII.—WATER SERVICE.

2. Prepare specifications and plans of water tanks, including tanks of reinforced concrete.

3. Report on complete water stations where track pans are used.

COMMITTEE XIV.—YARDS AND TERMINALS.

2. Development of mechanical handling as a means of promoting rapidity and economy in the handling of freight.

3. Submit typical track layout for passenger terminal of medium size, both dead end and through, and analyze graphically the train capacity of the layout, conferring with committee on signals and interlocking.

COMMITTEE XV.—IRON AND STEEL STRUCTURES.

2. Report findings on effect of impact on bridges.

3. Recommend specifications for bridge erection.

4. Secondary stresses.

5. Influence of theory, experiment and experience on bridge design.

6. Rules for instruction and guidance of inspectors in mill, shop and fields.

COMMITTEE XVI.—ECONOMICS OF RAILWAY LOCATION.

2. Continue the consideration of all questions connected with railway location, grades, lines and improvement of grades and line affecting the economic operation with relation to traffic, tonnage, ratings, speed, density of traffic and financial consideration, with the special aim in view of establishing uniform methods and unit values for investigating and analyzing the relative changes and costs of comparative routes or proposed grade reductions and line corrections.

COMMITTEE XVII.—WOOD PRESERVATION.

2. Extend specifications to include Rueping, Lowry and other widely used processes.

3. Continue investigation of proper grouping of different timbers for antiseptic treatment.

4. Present specifications for timber and piles intended for treatment.

COMMITTEE XVIII.—ELECTRICITY.

1. Report on proper lateral and vertical clearance required for installation for electric traction. (See report of American Railway Association.)

2. Report on best safeguards to be used in connection with transmission line crossings over tracks, giving the recommendations in the form of specifications.

3. Insulation.

4. Maintenance organization.

5. Electrolysis.

COMMITTEE XIX.—CONSERVATION OF NATURAL RESOURCES.

1. Co-operate with and continue to report proceedings of the National Conservation Commission.

COMMITTEE ON UNIFORM GENERAL CONTRACT FORMS.

1. Review and revise general contract forms presented at the tenth annual convention.

International Railway Fuel Association.

The second annual meeting will be held at the La Salle Hotel, Chicago, May 23-26, 1910. Following are the subjects which will be discussed:

Papers Nos. 1 and 5 Consolidated.—"Grade of Fuel Most Suitable for Locomotive Use, Considering Cost Per Unit of Traffic and Best Interests of Producer." "Recommended Methods of Preparing Coal as to Size for Locomotives." J. G. Crawford, chairman, fuel engineer, C., B. & Q., Chicago; LeGrand Parish, S. M. P., L. S. & M. S., Cleveland, Ohio; Curtis Scovill, A. G. S. A., Central Coal & Coke Company, Dallas, Tex.

Paper No. 2.—"Standard Uniform Blank for Reporting all Items of Cost in Connection with Fueling Stations and Handling Fuel for all Types of Stations and Conditions." R. Emerson, chairman, consulting engineer, A., T. & S. F. Ry., Chicago, Ill.; F. V. Hetzel, chief engineer, Link Belt Co., Nicetown, Pa.; A. E. Averill, editor, *American Engineer and Railroad Journal*, New York; N. M. Rice, G. S. K., A., T. & S. F. Ry., Topeka, Kan.

Paper No. 3.—"Accounting for Fuel Consumed; Individual Records of Performance." W. E. Symons, chairman, C. & G. W., Chicago; E. A. Foos, C. C., Fuel, Rail and Tie Dept., C., B. & Q., Chicago; E. J. Roth, Jr., fuel inspector, B. & O., Baltimore, Md.

Paper No. 4.—"Methods of Purchasing Fuel with Regard Both to Traffic Conditions and to Producers' Interests. Relation between Producer and Railway." W. H. Huff, chairman, V. P., Victor-American Fuel Co., Denver, Colo.; L. L. Chipman, G. S. M., Fidelity Coal Mining Co., Kansas City, Mo.; W. K. Kilgore, fuel agent, C., M. & St. P., Chicago.

Paper No. 6.—"Methods of Supervision, Instruction and Encouragement in Locomotive Operation to Secure Greatest Efficiency in Fuel Consumption." D. Meadows, chairman, assistant division M. M., Michigan Central, St. Thomas, Ont.; W. C. Hayes, superintendent locomotive operation, Erie, New York; J. McManamy, R. F. of E., Pere Marquette, Grand Rapids, Mich.

Special Paper "A."—"Character of Membership that Should be Encouraged in the Association and Steps to Secure that Membership." S. L. Yerkes, fuel agent, Queen & Crescent System, Lexington, Ky.

Special Paper "B."—"Methods of Kindling Locomotive Fires." C. F. Richardson, assistant to G. S. M. P., C., R. I. & P., Chicago.

Special Paper "C."—"Mechanical Preparation of Fuel." Professor H. H. Stoek, professor of mining engineering, University of Illinois.

Railway Telegraph Superintendents.

The programme for the 29th annual convention of the Association of Railway Telegraph Superintendents, to be held in Los Angeles, June 20-24, includes the following subjects:

Wireless Telegraphy, by William Maver, Jr.; Education for efficient railway service, D. C. Buell (U. P.); Protecting telephone lines from lightning, M. E. Launbranch (U. S. Elec. Co.); Automatic block signaling, H. P. Ryner (Hoeschen Signal Co.); Telephone train despatching, E. E. Dildine (Nor. Pac.); Testing of telegraph and telephone circuits, V. E. Kissinger (C., B. & Q.); Telephoning to and from trains, E. P. Griffith (Erie).

A party of members will go in a special car from Chicago over the Santa Fe June 14 at 10 p.m., leaving Kansas City the 15th 11:30 a. m. All who expect to join this party should send early notice to Secretary P. W. Drew, 135 Adams street, Chicago.

Omaha Railway Club.

General Charles F. Manderson, formerly general solicitor of the Chicago, Burlington & Quincy, addressed the Omaha Railway Club on April 13 on the early history of railways in Nebraska. General Manderson located at Omaha in 1869 and has, therefore, witnessed the entire development of railways in Nebraska. His address drew a very interesting contrast between the railway facilities in the West when he moved to it and the public attitude toward them and the conditions at the present time. He opposed extensions of government regulation which tend to deprive the owners and officers of railways of the management of the properties.

American Society of Civil Engineers.

At the meeting held on April 20 a paper by Herbert M. Wilson, M. Am. Soc. C. E., entitled, "Federal Investigations of Mine Accidents, Structural Materials and Fuels, at the United States Testing Station, Pittsburgh, Pa.," was presented for discussion and illustrated with lantern slides. This paper was printed in "Proceedings" for February, 1910.

Traffic Club of New York.

At the meeting to be held on April 26, at the Hotel Astor, New York, R. N. Collyer, chairman, committee on uniform classification, will speak on "Uniform Classification."

Brotherhood of Railway Clerks.

The seventh annual convention of the International Brotherhood of Railway Clerks was held at New Orleans April 18-22.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; May 10-13; Indianapolis.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; June 7, 1910; Niagara Falls, Ont.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio
AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; during first week in month.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., N. Y.; 2d Friday in month; New York.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; May 18; New York.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty. C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago; June 20-22; Atlantic City.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.; July 12; Chicago.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 28-July 2; Atlantic City.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; New York; May 31—June 3; Atlantic City
AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June 29, 1910; Colorado Springs.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May 25-27; Chattanooga, Tenn.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wis. Central Ry., Chicago; June 20-24, 1910; Los Angeles.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., N. Y.; June 21-22; Colorado Springs.
BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays; Montreal.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesdays; Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 15, 1910; California.
GENERAL SUPERINTENDENTS' ASSOC. OF CHICAGO.—Third Wednesday in month; Chicago.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., N. Y.; May 24-27; Niagara Falls, Ont.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11, Brussels; July 4-16; Berne, Switzerland.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 23-26; Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; May 3-7; Cincinnati.
INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit. Mich.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 15-17; Atlantic City.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
NORTHERN RAILWAY CLUB.—Fourth Saturday in month; Duluth, Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Blk.; 2d Wednesday in month.
RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City.; Third Friday in month; Kansas City.
RAILWAY ASSOCIATION OF SPECIAL AGENTS AND POLICE OF U. S. AND CANADA.—May 10-13; Los Angeles, Cal.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual meeting October 11-13, Atlantic City.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collinwood, Ohio; May 16-18; St. Louis.
RICHMOND RAILROAD CLUB.—F. O. Robinson; Second Monday in month, except June, July, August; Richmond, Va.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.
SHORT LINE R. R. ASSOCIATION.—First Monday in month; New York.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, 1134 La Salle St. Station, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R., East Buffalo, N. Y.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

The canals of the state of New York are to be opened for traffic on May 15, except the Black river canal, which will not be opened until June 1.

Canadian vesselmen say that the low rates for export grain by way of Buffalo and the American Atlantic ports, recently announced, have already drawn three million bushels of Canadian grain that way.

A. T. Siler, chairman of the Kentucky Railway Commission, has announced that this commission will investigate the earnings of the Pullman Company in Kentucky to find if it would be justified in reducing sleeping car rates in that State.

The "Farmers' Special" of the Northern Pacific is as imposing as a transcontinental limited—sleeping cars, a dining car and five demonstration cars. In the period between June 20 and July 2 the train is to visit 50 towns in Montana, at each of which two-hour "institutes" will be held.

The Grand Trunk has announced in Chicago that it will make a rate of a fare and a third plus $2 for the annual meeting of the National Educational Association at Boston in July. The other Chicago lines have decided not to meet this rate except that the Wabash will meet it on business passing through Canada.

Between Syracuse and Rochester the New York Central has taken off three local passenger trains each way, for the reason, it is said, that the passengers are now traveling by electric lines. The Rochester, Syracuse & Eastern electric line, which was opened between Rochester and Syracuse December 16, is said to have received a heavy patronage. There is talk of putting on electric cars to run through between these cities without stopping.

Prof. Thomas Shaw, the agent of the Great Northern, who supervises the company's experiment farms in Montana, finding that large numbers of immigrants now pouring into that country do not understand the necessity of cultivating their farms in a way quite different from what they have been accustomed to in states east of the Mississippi, has issued a pamphlet giving outlines of what to do the first three years on a Montana farm so as to best conserve the moisture.

The Central Passenger Association lines have decided to make the same reduced rates this summer from Chicago to the East that they made last summer. The basis will be a fare and a third plus $1.50 for the round trip. On this basis the rate from Chicago to New York and return over the standard lines will be $28.20, over the Michigan Central $26.85, and over the differential lines $25.50. The rates will go into effect June 1 and will remain in effect until September 30. Each ticket will have a 30-day limit. The rates will be in effect in all the territory east of Chicago and north of the Ohio river.

The Interstate Commerce Commission has announced that an investigation of the matter of reduced rates on returned shipments has been assigned for hearing at Minneapolis, Minn., on April 22 and at Chicago on April 25. The testimony will be taken by Examiner Lyon. The investigation has grown out of the action of the carriers in Western Classification territory in withdrawing reduced rates on returned shipments in accordance with a previous ruling of the Commission. The National Industrial Traffic League has appointed the following committee to represent it at these hearings: W. J. Evans, H. C. Barlow, W. D. Hurlbut and C. A. Jennings, of Chicago; C. B. Gregory, of Rockford, Ill.; B. H. O'Meara, of Cedar Rapids, Iowa, and W. P. Trickett, of Minneapolis, Minn.

The General Electric Co., Schenectady, N. Y., has complained to the New York State Public Service Commission against the new national car demurrage rules, which have been put in force at Schenectady by the New York Central and the Delaware & Hudson. The General Electric Co. has in its plant 14 miles of track, seven locomotives and 21 cars, and complains that the railways are unreasonably charging demur-

rage on the General Electric Company's private cars when these cars are in the yards of the G. E. Co. Complaint is also made that notices of arrival of freight are insufficient. The company needs to know the contents of a car and where it came from in order to be able to know which one of the large number of buildings within the plant it should be sent to. Other features of the rules are also declared unjust.

The Interstate Commerce Commission has announced that it will give a hearing in Chicago on April 25 regarding the practice of the railways in granting reduced passenger rates limited to members of particular organizations. The National Association of Letter Carriers has complained to the commission that for its biennial convention at St. Paul, Minn., in September, 1909, it contracted with the Western Passenger Association lines for a rate of a fare and a half for the round trip on condition that 1,000 or more persons attend. Only 888 persons holding the certificates required by the association attended the convention, and its agents, therefore, refused to validate these passengers' tickets so as to entitle them to the reduced rate. It is alleged that 142 persons attended the convention on semi-tourist rates, which differed from those used by other persons attending the convention only in lacking the certificate feature, but that these were not allowed to be counted to make up the necessary 1,000 in attendance. The commission is asked to investigate and to order the roads to refund to persons who attended the convention an aggregate of $5,190.

J. C. Lincoln, president of the National Industrial Traffic League, has issued a circular letter to members of this association impressing upon them the desirability of co-operating with the railways to reduce, as much as practicable, the abuse and misuse of tariffs published by the roads. Last March the Southwestern Tariff Committee and the Western Trunk Line Committee issued notice that after April 1 the practise of distributing railway tariffs free would be discontinued, and that a charge of $1 per issue per calendar year would be made to those desiring to have their names continued on the mailing list. Negotiations between the shippers and the traffic officers of the railways resulted in these orders being rescinded. The National Industrial Traffic League concedes, however, that abuses have crept into the distribution of tariffs. The carriers could, to a large extent, remedy these, Mr. Lincoln says, by a more careful scrutiny of their mailing lists. "The shippers, on the other hand, he adds, "should co-operate with the railways in eliminating the unnecessary expense due to duplication in the distribution of tariffs. Each organization and firm is urged to examine their records and to notify the carriers to discontinue tariffs in which it is not interested; also to direct attention to those addresses which should be discontinued."

The Illinois Manufacturers' Association is conducting a campaign against the advance in coal rates from the coal fields in Indiana and Illinois to Central and Northern Illinois points, which has been announced by the railways. In a circular, John M. Glenn, secretary of the Association, says, "the consumers of coal in Illinois regard the advance as unnecessary, exorbitant and discriminatory; and it has been decided to appeal to the Illinois Railway Commission and request an investigation in order that the maximum rate on the schedule of charges if too high may be reduced." Mr. Glenn's circular is accompanied by a blank petition, which shippers are requested to fill out and send to the Illinois Railway Commission. The petition asks the Commission to "fix maximum and minimum rates which will be fair to carrier and consumer alike, because the advance as proposed will work great and unnecessary injury to the industries of Illinois and the other consumers of Illinois soft coal, and will be a discrimination against the industries of this state in favor of other states of the Union that use Illinois coal." Both the rates which the roads have been charging and the new rates which they propose to put into effect are less than the maximum rates heretofore fixed by the Commission. Mr. Glenn asserts in his circular that the advance in the rates means an increase of at least $2,000,000 a year in the revenue of the carriers. The advances have been published already in the *Railway Age Gazette*, and range from 8 to 12 cents a ton.

In its campaign to stimulate interest in scientific farming, the Pennsylvania Railroad has issued a handsome pamphlet telling what the road is doing to create traffic by co-operating with the farmer. In the last three years the road, we are informed, "has run educational trains and steamboats on practically all of its lines." [The steamboat from Altoona to Pittsburgh must have passed in the night.] It has distributed farming literature, established experimental farms and undertaken the education of its agents in agricultural diplomacy. The pamphlet sums up by saying: "What does it all mean to the railway? It means there will be more fertilizers to haul, more farm implements, more raw material from which these tools are made, more crops to haul and more passengers to carry. * * *" That this conclusion is amply justified is evidenced by the facts, which have been published in the *Railway Age Gazette*, concerning the large increases in shipments of farm produce from southern New Jersey and other regions traversed by Pennsylvania lines. The pamphlet cites striking instances of enterprise on the part of railways which has brought marked benefits to farmers. It was an agent of the Pennsylvania who, in an idle afternoon, developed the traffic in a certain grape growing region where now a thousand carloads are shipped every season. The Florida East Coast Railway, by supplying seed and building side tracks to the farms, developed the pineapple industry in Florida, whence the shipments now amount to a million crates annually. One of the Pennsylvania's "farmers' specials" in three days had audiences aggregating 5,000 men. If any critic is so rash as to claim that farmers cannot be taught much in 40 minutes, the Pennsylvania experts are ready to demolish his claim in short order.

REVENUES AND EXPENSES OF EXPRESS COMPANIES.

FOR THE MONTH OF DECEMBER, 1909

Name of company. Mileage of all lines covered: Rail lines	Adams Express. 31,027	American Express. 46,373	Canadian Express. 7,078	Can. Nor. Express. 3,198	Globe Express. 1,900	Great Nor. Express. 7,295	National Express. 1,094	Northern Express. 6,497	Pacific Express. 22,247	Southern Express. 30,721	United States Express. 23,922	Wells, Fargo & Co. 56,601	Western Express 3,452
Other lines	3,461	1,210	2,792	20	.....	211	.....	261	608	1,648	611	5,189	4
Operating revenues:													
Express	$3,408,833	$3,458,650	$238,077	$37,547	$52,987	$257,341	$113,890	$329,379	$896,159	1,680,099	$1,607,032	$2,886,940	$69,070
Misc. transportation	.....	.....	.....	.....	.....	.....	.....	.....	5	163	.....	163	331
Nontransportation	16,547	108,634	8,448	1,772	519	1,323	599	5,041	11,970	17,721	21,859	47,615	977
T'l receipts operation	3,425,380	3,567,285	246,525	39,319	53,506	258,664	114,490	334,420	908,134	1,697,820	1,628,891	2,934,717	70,378
Exprs. privileges—Dr.	1,735,547	1,604,606	122,744	14,977	26,519	104,021	42,467	159,759	434,094	795,353	746,487	1,393,400	29,660
Total	$1,689,833	$1,962,679	$123,781	$24,342	$26,987	$154,643	$72,023	$174,662	$474,041	$902,467	$882,404	$1,541,318	$40,719
Operating expenses:													
Maintenance	$100,518	$63,267	$1,707	$96	$170	$970	$643	$1,509	$11,012	$18,432	$43,177	$36,564	$647
Traffic	7,986	18,552	1,318	214	1,126	929	.....	2,625	6,507	5,017	20,893	17,575	972
Transportation	1,117,201	1,283,076	78,471	10,620	14,934	55,343	47,635	79,422	240,353	457,446	672,579	924,134	21,059
General	87,400	106,301	8,189	1,385	2,632	3,705	2,990	4,159	14,050	45,554	42,296	63,464	1,609
Total	$1,313,105	$1,471,196	$89,686	$12,316	$18,862	$60,947	$51,267	$87,716	$271,922	$526,450	$778,945	$1,041,733	$24,287
Net operat'g rev. or def.	$376,729	$491,482	$34,096	$12,026	$8,126	$93,695	$20,756	$86,946	$202,119	$376,017	$103,459	$499,584	$16,431
Taxes	12,798	8,207	1,150	130	550	2,752	18	3,500	4,948	11,628	9,204	16,621	455
Operating inc. or loss.	$363,931*	$483,276	$32,946	$11,896	$7,576	$90,943	$20,738	$83,446	$197,171	$364,389	$94,255	$482,963	$15,977

*Includes $21,608, paid Southern Express on account of operation of L. & N. line south of Saxton, July 1st to December 31, 1909.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF FEBRUARY, 1910.
(See also issues of April 8 and 15.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	142	$88,203	$30,413	$130,267	$17,051	$19,278	$3,341	$41,267	$5,230	$86,167	$44,100	.....	$4,350	$39,750	$25,419
Alabama Great Southern	309	230,638	68,833	329,194	35,846	60,122	9,571	107,261	11,536	224,336	104,858	—$723	11,808	92,327	13,598
Central Vermont	411	186,363	52,842	259,456	30,710	47,359	7,572	135,105	6,876	227,622	31,834	338	10,116	22,056	—1,102
Chicago & Alton	998	643,105	284,186	1,013,971	92,949	139,004	35,510	436,280	34,801	738,544	275,427	—2,158	49,000	224,269	—59,500
Chicago & Erie	269	378,892	47,323	466,300	32,770	85,649	18,263	188,025	9,072	333,779	132,521	.....	10,938	121,583	81,619
Chicago, Indiana & Southern	340	346,186	16,142	369,129	25,453	59,975	8,604	124,600	7,878	226,510	142,619	—234	13,500	128,885	84,271
Cincinnati, New Orleans & Tex. Pac.	337	558,940	122,069	720,991	80,602	121,193	20,130	194,290	17,711	433,926	287,065	—708	20,000	266,357	74,543
Cleveland, Akron & Columbus	212	141,606	31,171	185,178	33,108	37,546	2,324	59,336	3,518	135,832	49,346	.....	5,000	44,346	3,390
Cumberland Valley	162	169,389	38,811	219,848	23,105	29,142	3,427	73,929	5,569	135,172	84,676	233	4,083	80,826	2,407
Florida East Coast	583	134,796	219,996	405,010	41,795	59,086	6,636	108,022	7,645	223,184	181,826	.....	12,500	169,326	—15,689
Georgia	307	168,950	55,035	238,307	30,090	35,923	9,323	110,803	6,687	192,826	45,481	.....	2,083	43,398	—10,397
Georgia Southern & Florida	395	114,470	58,404	206,744	18,382	48,174	6,563	84,461	8,433	166,014	40,730	.....	8,119	32,611	—16,344
Hocking Valley	350	505,948	51,887	576,868	50,564	109,103	7,535	184,469	10,650	362,321	214,547	—5,516	20,769	188,262	133,268
Iowa Central	558	205,325	34,238	250,906	17,521	43,683	9,914	130,452	9,101	210,671	40,235	.....	7,493	32,742	14,363
Kanawha & Michigan	175	192,070	20,438	216,951	42,068	61,395	1,786	54,312	6,037	165,598	51,353	—25	6,846	44,482	42,029
Long Island	390	198,898	301,350	524,435	86,712	111,398	12,769	298,107	18,756	527,742	—3,307	16,132	33,232	—20,407	6,844
Louisiana Western	198	97,358	51,737	157,255	20,075	26,412	5,209	49,155	6,424	107,275	49,980	—759	5,500	43,721	—33,771
Minneapolis & St. Louis	1,027	233,248	63,953	321,093	32,996	44,627	15,314	170,239	13,955	277,131	43,962	—190	17,986	25,785	—3,265
Missouri Pacific	3,287*	1,443,962	302,117	1,945,935	303,830	302,174	57,230	924,764	64,426	1,652,424	293,511	—4,332	79,385	209,794	.....
Morgan's La. & Tex. RR. & SS. Co.	358	227,990	101,173	352,356	48,162	39,223	9,287	131,736	13,729	242,137	110,219	—2,499	17,000	90,720	—5,581
Nashville, Chattanooga & St. Louis	1,230	689,576	182,268	929,281	116,435	138,802	33,552	321,591	23,928	634,308	294,973	—1,388	21,971	271,614	85,657
New Orleans & North Eastern	196	209,539	50,644	286,742	26,479	39,253	7,886	97,189	10,627	181,434	105,308	.....	8,200	97,108	35,249
New York, Philadelphia & Norfolk	112	192,246	22,890	229,797	28,066	40,466	3,406	88,923	9,070	169,931	59,866	.....	6,850	53,016	7,822
New York, Susquehanna & Western	151	140,797	43,890	210,938	17,371	18,683	1,374	78,433	3,994	119,855	91,083	—2,982	11,317	76,784	—2,373
Northwestern Pacific	376	73,359	91,369	182,791	38,927	31,815	1,980	78,178	9,504	160,404	22,387	.....	10,988	11,399	14,235
Peoria & Eastern	351	176,210	46,520	239,770	22,647	58,437	5,062	95,023	5,232	186,401	53,369	.....	9,200	44,169	5,726
Pittsburgh & Lake Erie	191	1,062,377	96,068	1,188,226	112,285	106,615	13,019	304,128	20,477	556,524	631,702	—427	28,000	603,275	256,621
Rutland	468	115,402	53,942	193,637	22,232	30,989	5,394	89,911	4,998	153,524	40,113	.....	8,892	31,221	3,923
St. Louis, Iron Mountain & Southern	3,883†	1,578,851	413,915	2,165,272	425,028	310,861	58,937	726,945	75,308	1,597,079	568,193	—6,163	78,530	483,500	399
Spokane, Portland & Seattle	420‡	179,635	47,203	237,757	57,374	24,438	3,580	92,143	7,471	185,006	32,751	—688	18,527	33,536	6,067
Toledo & Ohio Central	441	257,301	34,926	303,743	36,316	59,418	5,278	111,533	6,634	219,179	84,564	—1,425	14,564	68,575	42,314
Toledo, St. Louis & Western	451	220,884	28,405	267,328	35,084	44,618	10,883	106,435	9,035	206,055	61,273	.....	13,900	47,373	—19,245
Vicksburg, Shreveport & Pacific	171	71,205	29,525	112,386	21,528	17,655	3,081	36,226	4,845	83,334	29,052	.....	6,300	22,752	5,732
Wabash	2,515	1,568,915	430,391	2,176,373	200,350	321,867	76,090	930,017	65,208	1,593,532	582,841	—4,180	75,538	503,123	179,917
West Jersey & Seashore	356	116,792	167,135	305,944	81,755	46,378	8,051	162,831	9,368	308,383	—2,439	—4,798	20,037	—27,374	23
Wheeling & Lake Erie	458	418,692	32,439	480,389	52,352	92,584	6,650	195,708	13,738	361,032	119,357	27,737	19,804	127,290	54,943
EIGHT MONTHS OF FISCAL YEAR 1910.															
Alabama & Vicksburg	142	$729,422	$321,480	$1,130,383	$171,582	$175,289	$29,647	$345,487	$41,359	$763,364	$367,019	.....	$34,851	$332,168	$112,694
Alabama Great Southern	309	1,781,148	705,626	2,724,188	328,013	620,174	71,734	795,105	73,402	1,888,428	835,760	—$4,273	90,460	741,027	133,672
Central Vermont	411	1,609,098	721,058	2,503,970	289,795	465,799	69,747	1,050,304	58,398	1,914,043	589,927	6,449	80,933	515,443	186,412
Chicago & Alton	998	5,642,291	2,844,666	9,201,831	1,107,338	1,059,477	315,537	3,142,734	245,150	5,870,236	3,331,595	—12,179	273,000	3,046,416	—248,653
Chicago & Erie	269	2,617,615	536,364	3,441,882	386,263	715,472	126,794	1,429,741	72,362	2,730,632	711,250	.....	87,508	623,742	310,052
Chicago, Indiana & Southern	340	2,257,111	179,784	2,490,671	343,096	429,307	68,241	832,210	65,036	1,737,890	752,781	166	101,503	651,444	284,436
Cincinnati, New Orleans & Tex. Pac.	337	4,562,696	1,048,082	5,906,037	666,665	1,114,719	155,447	1,606,121	142,638	3,685,590	2,220,447	—1,346	160,000	2,059,102	496,593
Cleveland, Akron & Columbus	212	1,194,065	344,229	1,646,416	243,029	403,335	22,522	523,473	30,496	1,222,855	423,561	.....	41,042	382,519	—19,119
Cumberland Valley	162	1,425,801	412,117	1,922,193	249,183	192,197	34,535	570,337	47,769	1,094,021	828,172	4,302	32,669	799,805	64,184
Florida East Coast	583	879,042	752,088	1,883,118	281,098	317,481	38,254	677,248	66,612	1,380,693	502,425	.....	94,267	408,158	199,568
Georgia	307	1,395,684	560,707	2,074,454	259,191	310,346	77,772	799,190	56,346	1,502,845	571,609	.....	16,644	554,965	180,107
Georgia Southern & Florida	395	884,252	491,010	1,597,595	161,138	332,805	45,855	581,935	69,342	1,191,075	406,520	6,442	68,947	344,015	25,104
Hocking Valley	350	4,284,183	599,901	5,048,747	640,195	905,528	60,168	1,406,686	94,840	3,107,417	1,941,330	80,090	170,487	1,850,933	592,679
Iowa Central	558	1,779,076	370,857	2,247,730	281,537	346,632	70,151	945,191	71,142	1,714,653	533,077	.....	59,427	473,650	116,043
Kanawha & Michigan	175	1,580,296	214,226	1,830,730	354,286	417,156	17,743	448,843	35,119	1,273,147	557,583	—212	55,179	502,192	241,164
Long Island	390	1,985,056	3,877,450	6,147,696	638,128	818,176	119,471	2,618,225	151,642	4,345,642	1,802,054	573,445	265,859	2,109,640	580,116
Louisiana Western	198	903,095	412,287	1,382,981	144,015	218,082	45,672	382,166	53,307	843,242	539,739	—1,520	46,138	492,081	—52,431
Minneapolis & St. Louis	1,027	2,260,561	831,895	3,309,698	343,991	383,727	103,855	1,297,086	107,597	2,236,256	1,073,442	—526	153,494	919,422	45,400
Missouri Pacific	3,287*	10,790,636	2,692,440	14,886,614	2,268,833	2,213,637	388,938	5,986,687	415,113	11,273,208	3,613,406	—25,330	540,675	3,047,401	.....
Morgan's La. & Tex. RR. & SS. Co.	358	2,417,976	775,623	3,377,502	423,693	378,359	81,225	1,138,445	102,584	2,124,306	1,253,196	—2,563	140,520	1,110,113	240,860
Nashville, Chattanooga & St. Louis	1,230	5,383,502	1,757,316	7,611,259	1,131,368	1,264,877	288,835	2,617,699	182,650	5,485,429	2,125,830	—7,217	165,471	1,953,142	262,019
New Orleans & North Eastern	196	1,663,577	416,578	2,258,244	226,702	350,733	69,505	762,886	83,626	1,493,452	764,792	.....	65,724	699,068	120,134
New York, Philadelphia & Norfolk	112	1,725,499	265,513	2,134,935	211,801	361,633	27,892	758,173	71,245	1,430,744	704,191	.....	51,200	652,991	143,578
New York, Susquehanna & Western	151	1,151,674	425,485	1,773,479	210,284	169,629	12,407	667,158	30,486	1,089,964	683,515	—39,979	90,533	553,003	—9,032
Northwestern Pacific	376	867,317	1,072,045	2,106,434	373,216	259,656	20,504	733,595	76,984	1,463,955	642,479	.....	85,869	556,610	134,647
Peoria & Eastern	351	1,565,570	477,737	2,194,073	234,083	396,534	43,285	767,979	40,827	1,482,708	711,365	.....	70,194	641,171	174,915
Pittsburgh & Lake Erie	191	10,298,637	989,042	11,580,304	1,066,641	889,176	109,240	2,468,106	163,530	4,696,693	6,883,610	—2,839	154,637	6,726,135	2,766,972
Rutland	468	1,159,783	748,521	2,132,522	295,986	299,981	51,664	776,558	44,289	1,468,478	664,044	.....	79,025	585,019	110,502
St. Louis, Iron Mountain & Southern	3,883†	12,743,568	3,592,962	17,729,825	2,653,099	2,436,199	443,469	5,493,898	546,523	11,573,188	6,156,637	—41,198	572,649	5,542,789	713,842
Spokane, Portland & Seattle	420‡	1,544,918	511,230	2,140,683	391,877	218,914	24,933	744,396	52,330	1,432,450	708,233	551	212,237	496,547	387,279
Toledo & Ohio Central	441	2,346,018	423,188	2,888,365	380,710	468,102	44,964	903,313	52,905	1,849,995	1,038,371	58,593	113,895	983,069	18,729
Toledo, St. Louis & Western	451	2,070,989	311,758	2,536,866	297,600	374,878	59,019	821,518	69,919	1,622,934	913,932	.....	97,900	816,032	75,264
Vicksburg, Shreveport & Pacific	171	570,974	322,438	970,705	172,509	173,015	26,763	281,368	35,193	688,848	281,857	.....	52,418	229,439	36,823
Wabash	2,515	13,129,085	4,785,674	19,389,342	2,228,764	2,599,921	616,991	7,246,601	532,861	13,225,138	6,164,204	—16,834	549,172	5,598,198	1,160,559
West Jersey & Seashore	356	1,091,569	2,413,962	3,760,565	644,056	442,741	109,561	1,520,070	69,199	2,785,627	974,938	8,969	160,297	823,610	103,467
Wheeling & Lake Erie	458	3,920,946	391,738	4,633,016	457,701	1,015,611	56,225	1,587,098	111,284	3,227,919	1,405,097	72,160	178,330	1,298,926	480,458

*Consolidation of Missouri Pacific Ry. and branches and Central Branch Ry., reported separately prior to August 9, 1909.
†Mileage operated February 28, 1909, 2,608 miles; beginning with February 1, 1910, this company's returns include: Arkansas & Louisiana Ry.; Mississippi River, Hamburg & Western Ry.; Arkansas Midland R.R.; Brinkley, Helena & Indian Bay R.R.; New Orleans & Northwestern R.R.; El Dorado & Bastrop Ry.; Farmerville & Southern R.R.; Little Rock & Monroe Ry.; Arkansas Southwestern Ry.; Coal Belt Ry.; Natchez & Western Ry.; Gurdon & Fort Smith R.R. and Gurdon & Fort Smith Northern Ry., all previously reported separately.
‡Mileage operated February 28, 1909, 272 miles.

Proposed Amendment of Long and Short Haul Clause of Interstate Commerce Act.

A conference of presidents, vice-presidents and general counsel of western lines was held in Chicago last week regarding the proposed amendment of the long and short haul clause of the Interstate Commerce act. Amendments have been introduced in both the senate and the house. The amendment introduced by Senator Heyburn, of Idaho, would make section 4 read as follows:

"That it shall be unlawful for any common carrier subject to the provisions of this act to charge or receive any greater compensation for the transportation of passengers or of like kinds of property for a shorter distance than for a longer distance over the same line in the same direction, the shorter being principally included within the longer distance; but this shall not be construed as authorizing any common carrier within the terms of this act to charge or receive as great compensation for a shorter as for a longer distance."

This amendment would radically change the act in two respects. It would strike out the words, "under substantially similar circumstances and conditions," which the Supreme Court has construed to mean that carriers may charge more for a shorter than for a longer haul to meet water competition and controlling competition by other railways. It would also strike out the proviso in section 4 which allows the Interstate Commerce Commission in special cases, after application by a carrier and investigation by the commission, to authorize the carrier to charge less for a longer than for a shorter haul and prescribe from time to time the extent to which the carrier may be relieved from the operation of this section. In other words, the Heyburn amendment and others which are under consideration would establish a hard and fast rule prohibiting the charge for a shorter haul to be, under any circumstances, greater than that for a longer.

The proposition is of special concern to the lines west of Chicago which are largely engaged in transcontinental business and also to the lines in the Southeast where the basing point system of rate-making generally obtains. The officers of the western lines state that the effect of the proposed legislation would be to compel them not, as Senator Heyburn apparently thinks, to reduce their rates to interior points in the West, but to raise them to the Pacific coast, and that the advances to the Pacific coast necessarily would be so great as to preclude the railways from hauling to the coast any commodities except those which can hardly be carried by water no matter how low may be the water rates made on them.

The proposed change would greatly disturb business conditions throughout the South and West and be destructive to the commercial and industrial interests of many places. The western lines probably will offer pretty vigorous opposition to it.

INTERSTATE COMMERCE COMMISSION.

Rates from West Virginia to Windsor, Ont.

Windsor Turned Goods Co. v. Chesapeake & Ohio et al. Opinion by Commissioner Clark.

Reparation awarded where joint through rate exceeded combination of locals. (18 I. C. C., 162.)

Demurrage Charges Rightly Assessed.

Sage & Co. v. Illinois Central. Opinion by Chairman Knapp.

Demurrage which accrued through the failure of a rebilling notice to reach the defendant was held to be properly a charge collectable by the railway. (18 I. C. C., 195.)

Misrouting by Shipper and by Carrier.

Spreckels Brothers Commercial Co. v. Monongahela Railroad et al. Opinion by Chairman Knapp.

In the two cases decided no reparation was allowed where misrouting was due to shipper's mistake and reparation was allowed in the case where misrouting was due to carrier's mistake. (10 I. C. C., 190.)

Rates on Specific Shipments Found Unreasonable.

H. Lorleburg Co. v. New York, Chicago & St. Louis et al. Opinion by Commissioner Lane.

Four shipments from Loraine, Ohio, to Oconomowoc, Wis., and nine shipments from Detroit, Mich., to Oconomowoc were charged unreasonable rates and reparation was awarded. (18 I. C. C., 183.)

No Reparation on Intrastate Shipment.

E. P. Dobbs v. Louisville & Nashville Railroad Company. Opinion by Commissioner Cockrell.

Complainant shipped three carloads of canned peaches from Oakhurst, Ga., to Marietta, Ga., and from thence rebilled one car to Lexington, Ky., and two cars to Cincinnati, Ohio. Held, that the movement from Oakhurst to Marietta was an intrastate movement. Reparation denied. (18 I. C. C., 210.)

Water Rate Not on File.

Milburn Wagon Co. v. Lake Shore & Michigan Southern et al. Opinion by Commissioner Clark.

Reparation is denied on a shipment which moved on a combination of a rail rate that was filed with the commission and water rate that was not filed.

Reparation was awarded on shipments which moved under joint through rates that were higher than the combination of local rates via the same route. (18 I. C. C., 144.)

Routing and Instructions Binding.

Hollingshead & Blei Co. v. Pittsburgh & Lake Erie et al. Opinion by Chairman Knapp.

Direction by a shipper that a shipment be sent from Cleveland, Ohio, to Menominee, Mich., all rail, does not impose on carriers the duty of transporting such shipment via an across-lake route, when both rates are shown in the tariff, although via the latter route a lower rate is applicable.

Rate on Skylight Glass Reasonable.

W. P. Fuller & Co. v. Southern Pacific et al. and 10 other cases disposed of at the same time. Opinion by Commissioner Clements.

Complaint that rough, rolled, ribbed and wired skylight glass when given a specific rate should nevertheless have a lower rate when the tariff contains provision that skylight glass n.o.s. is given a lower rate is not sustained. (18 I. C. C., 202.)

No Discrimination in Demurrage Charges in Ohio.

Friend Paper Co. v. Cleveland, Cincinnati, Chicago & St. Louis. Opinion by Chairman Knapp.

All the railway companies in Ohio attack the state commission's right to prescribe demurrage rules on interstate traffic. The defendant in this case eliminated the average plan for assessing demurrage prescribed by the Ohio commission previous to its elimination by other roads in Ohio. This train of circumstances caused a loss to the complainant but does not afford a legal basis on which refund can be made. (18 I. C. C., 179.)

Higher Rate Southbound Than Northbound.

T. B. Littell v. St. Louis Southwestern et al. Opinion by Commissioner Harlan.

The through fares between Cairo, Ill., and Waco, Tex., having been reduced pending a contest in the courts as to the validity of the 2-cent per mile legislation in Arkansas and Missouri, were later restored when the enforcement of those statutes was enjoined. Because of its unusual size and the complications involved the defendants were unable to reprint the schedule showing the restored northbound fares until some weeks after the southbound fares had been raised to their former level. Although the complainant,

under these circumstances, had enjoyed the advantage of the lower rate on the northbound journey that fact affords no just ground for giving him the advantage of a like rate on the southbound journey. Reparation denied and complaint dismissed. (18 I. C. C., 187.)

Rate on Butter Boxes Unreasonable.

Roach & Seeber Co. v. Chicago, Milwaukee & St. Paul et al. Opinion by Chairman Knapp.

Complainant asks that butter boxes should be classified with wooden pails, tubs, etc., under class D rate. The commission finds that most of the articles under class D can be nested, while butter boxes cannot be nested. The commission refused to give butter boxes the class D rate, but finds that the rate of 15 cents per 100 lbs. from Milwaukee, Wis., to Waterloo is unreasonable and should not exceed 9 cents per 100 lbs. (18 I. C. C., 172.)

Attempt to Obtain Low Intrastate Rate Unsuccessful.

Wells-Higman Co. v. St. Louis, Iron Mountain & Southern et al. Opinion by Chairman Knapp.

Shipment was made in a roundabout way with rebilling at Wynne, Ark., at the expressed direction of the complainant, apparently to take advantage of a rate established by the railway commission of Arkansas from Wynne to Horatio. As it turned out, the actual rates charged were considerably higher than if the shipment had been made direct without rebilling, but since this rebilling was ordered by the complainant the complaint is dismissed. (18 I. C. C., 175.)

Switching Charges at Utica Reasonable.

Utica Traffic Bureau v. New York, Ontario & Western. Opinion by Chairman Knapp.

Defendant's charge of 30 cents per ton for switching carloads of coal from the New York Central tracks at Utica, N. Y., to the Utica Steam & Mohawk Valley Cotton Mill in that city, is alleged by complainant to be unreasonable. The Lehigh Valley and New York Central, which transport the coal from Bernice, Pa., at a rate of $1.50 per gross ton, absorb switching charges to the extent of $5 per car, and the amount of switching charges assessed on the 394 cars mentioned in the complaint in excess of the $5 per car absorbed by the line carriers averaged $2.95 per car. The switching tariff, in connection with the tariff of the line carriers, in effect names a through rate from the mine to the mill, and the shipper can complain only of so much of the switching charge as he is required to pay; and the amount actually paid, averaging $2.95 per car, is not found to be unreasonable for the service performed. (18 I. C. C., 168.)

Minimum Rate on Bulky Articles Unreasonable.

S. H. Knox v. Wabash Railroad. Opinion by Commissioner Lane.

The rule in the official classification providing that articles too long to be loaded into a 36-ft. box car through the side door shall be charged for on the basis of 4,000 lbs. minimum weight is held to be unreasonable and reparation awarded. (18 I. C. C., 185.)

Houston Structural Steel Co. v. Wabash Railroad et al. Opinion by Commissioner Prouty.

Rule in western classification applying first class rate and minimum of 5,000 lbs. to articles too large to be loaded through the side door of a 36-ft. box car, or too long to be loaded through the end window thereof, found unreasonable when applied to the shipment of structural steel in this case. Reparation awarded. (18 I. C. C., 208.)

Brunswick-Balke-Collender Co. v. Chicago, Milwaukee & St. Paul et al. Opinion by Commissioner Cockrell.

Reparation awarded for an excessive charge made through the application of a rule providing a minimum weight for articles too bulky to be loaded in a box car through the side door. (18 I. C. C., 165.)

Shipper's Mistake in Routing.

Stone-Ordean-Wells Co. v. Philadelphia, Baltimore & Washington et al. Opinion by Commissioner Prouty.

The Baltimore & Ohio published a tariff showing a rate in connection with the Baltimore & Eastern Shore Transportation Co. from Ridgely, Md., to Duluth, Minn. As a matter of fact the Transportation company had stopped running steamers between Ridgely and a point on the Baltimore & Ohio and had gone out of business, so that it was impossible to make a shipment over the route indicated in the tariff of the Baltimore & Ohio. The complainant was told this, but finding that shipment could be made from Ridgely to Wilmington via the Philadelphia, Baltimore & Washington, and from there to Duluth via the Baltimore & Ohio and the Mutual Transit Co., the shipper ordered the goods sent over that route. The charges over the route via the P., B. & W. were higher than the charges quoted in the B. & O. tariff from Ridgely to Duluth, but the commission holds that since the shipper was notified of the mistake in the B. & O. tariff and persisted in ordering the shipment made, no reparation can be given him for the higher charges made on the shipment moving via the P., B. & W. (18 I. C. C., 160.)

Rates on Ties Unreasonable.

American Creosote Works, Ltd., v. Illinois Central et al. Opinion by Commissioner Cockrell.

When advised that complainant had entered into a contract under which ties were moving on a rate in effect defendants canceled this. It is held that complainant was directly damaged thereby in the matter of car supply. Following the doctrine in *Washer Grain Co. v. M. P.*, 15 I. C. C., 147, and *Joynes v. P. R. R.*, 17 I. C. C., 361, no reparation will be awarded.

Rate charged for the movement of ties from New Orleans to East St. Louis found to be unreasonable and unjustly discriminatory. Reparation awarded.

The difference in the charge for switching at Carbondale, Ill., and New Orleans, La., found not to be unjustly discriminatory.

Practice of defendants of charging complainant a rate per 100 lbs. while at the same time according to others a rate under which the weight of a tie was estimated at 100 lbs. per tie, found to be unreasonable and unjustly discriminatory. Reparation awarded. (18 I. C. C., 212.)

Reparation Justified.

F. R. Penn Tobacco Company v. Old Dominion Steamship Co. et al. Opinion by Commissioner Harlan.

The commission again expresses its appreciation of the importance of the principle that a reduction in rates, standing by itself and unaccompanied by other facts of convincing character, ought not to be accepted either as proving or necessarily tending to prove that previous higher rates were unreasonable; and also its appreciation of the principle that carriers ought not to be discouraged in their efforts to meet the views of shippers by making rate reductions and then being compelled to pay reparation on previous shipments on the basis of the lower new rate.

When, however, the rate actually collected on raw sugar from New York to Reidsville, N. C., is conceded by the defendants to have been "relatively out of line" and "wrong" when considered in connection with the rate then in effect to Winston-Salem and Martinsville, Reidsville being shortly thereafter grouped with those two points under a common rate, the commission is forced to the conclusion that the rate collected was unreasonable. Reparation awarded. (18 I. C. C., 197.)

Division of a Through Rate Attacked.

Copper Queen Consolidated Mining Co. v. Baltimore & Ohio et al. and 16 other cases in which substantially the same complaint was made. Opinion by Commissioner Cockrell.

Complainants ship coke from the West Virginia-Pennsylvania fields to their copper smelters at El Paso, Tex., and

Globe, Ariz. The through rate on this coke at the time complained of was $7.80 per ton to El Paso and $7.95 per ton to Globe. The reasonableness of this through rate is not questioned. The coke moves to El Paso and Globe via Chicago or Chicago rate junctions, the carriers east of Chicago receiving $2.65 of the total $7.80 rate to El Paso. The local rate from the West Virginia-Pennsylvania fields to South Chicago on furnace coal for blast furnaces and for smelting iron ore was at the time of shipment $2.35. Complainants ask reparation for the difference between the $2.65 rate paid on their coal and the $2.35 rate in effect on other coal.

The commission finds that no such reparation can be made. The joint through rates from the ovens to El Paso and Globe were units, and the division of the through rate cannot be made the subject of a complaint such as this. Reparation authorized by the act to regulate commerce is for damages or injuries suffered by complainant, and this commission will not award reparation where the case shows plainly that the demand is not based on a real damage or injury suffered by the shipper. (18 I. C. C., 154.)

STATE COMMISSIONS.

The Public Service Commission of New York, First district (New York City), has written to the Long Island Railroad Company a severe letter concerning the killing of nine persons on the tracks of the road in the three months of December, January and February under circumstances which the road cannot explain. Officers of the company declare that the cause of each of these fatal accidents is unknown. There is no information as to what trains, if any, struck the persons who were killed. The commission says it is impossible to believe that if an examination had been promptly and searchingly made those nine accidents would have remained unexplained. The commission is not willing to assume that absence of full reports from employees affords conclusive evidence that no employee knew anything about the cause of the fatalities.

The New York State Public Service Commission has refused its consent to the abandonment of the station of the New York & Ottawa Railroad at Brandon, Franklin county. Brandon 20 years ago was a village of considerable size, having probably about 1,200 inhabitants. It now consists of a few houses occupied by four families of a total population of between 20 and 25. The nearest railway station to the north is Madawaska, four miles distant, and to the south Bay Pond, 3.7 miles. There is no connection by highway between Brandon and Madawaska and the station at Bay Pond can be reached only by a private road leading across premises owned by William Rockefeller. At the entrance to this private road there is a sign posted saying "Private road, no admittance." There is no access to the station except over this private road. The total passenger receipts for passengers in and out of Brandon for the year ended November 30, 1909, were $455. Passenger trains were stopped at the station 530 times and a total of 954 passengers were handled in and out. Freight revenues from January 13 to November 5, 1909, were only $42. The commission says that if there were a desire to drive out these people of Brandon from their homes, it would be difficult to conceive a more efficacious plan to that end than to discontinue their station. If the station were discontinued they would be compelled to obtain access to the Bay Pond station over the private road of Mr. Rockefeller, and it is not believed to be good policy that people desiring to reach a railway station should be obliged to travel over a private road; the fact that Mr. Rockefeller is willing to allow this private road to be used at the present time for access to the station cuts no figure in the matter.

COURT NEWS.

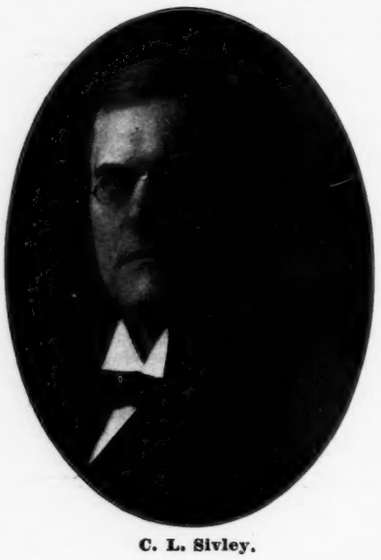
The supreme court of Colorado, in the case of Derry against the Denver & Rio Grande, has affirmed a verdict for $1,000 damages for injuries due to the mistake or neglect of a porter of the Pullman Company. The court held that the Pullman porter was to be considered as one of the train crew.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

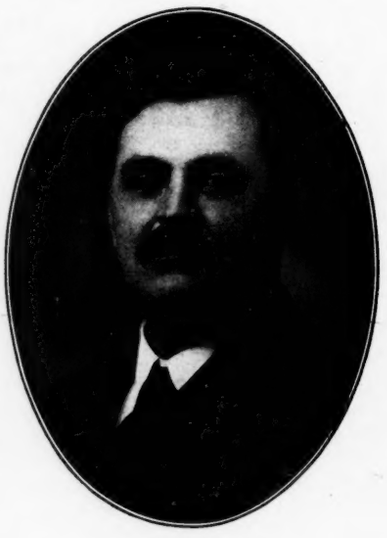
Executive, Financial and Legal Officers.

C. L. Sivley, assistant general solicitor of the Yazoo & Mississippi Valley, with office at Memphis, Tenn., has been appointed general attorney of the Illinois Central, with office at Chicago, succeeding W. S. Kenyon, recently resigned to become assistant to the attorney general of the United States. He will have charge of litigation on the Illinois Central system in the states south of the Ohio river. Mr. Sivley was born near Jackson, Miss., and in 1887 entered the University of Mississippi. He graduated from the legal department of that institution in 1893, after which he was for a number of years engaged in the general practice of law at Oxford, Miss. In 1906 he was elected professor of law in the University of Mississippi, and the next year was appointed assistant general solicitor of the Yazoo & Mississippi Valley.



C. L. Sivley.

William H. Wilson, whose appointment as assistant to the third vice-president of the Northern Pacific, with office at St. Paul, Minn., has been announced in these columns, was born July 20, 1864, at Weatherly, Pa. He received a high school education and began railway work in April, 1881, with the Lehigh Valley Railroad. In 1886 he went with the Dunmore Iron & Steel Company, and was then consecutively foreman, general foreman and master mechanic of that company, the Pennsylvania Coal Company and the Erie & Wyoming Valley Railroad, now a part of the Erie. From January, 1901, to March, 1903, he was master mechanic of the Erie at Dunmore, Pa., when he was transferred to Susquehanna, Pa., where he was in charge of four divisions. In November, 1905, he was appointed superintendent of motive power of the Buffalo, Rochester & Pittsburgh, which position he held until his recent appointment.



W. H. Wilson.

Einar Olsen has been appointed auditor of the Coahuila & Zacatecas, with office at Saltillo, Coahuila, Mex., succeeding E. C. Farrell, transferred.

D. E. Marshall has been appointed a division accountant of the maintenance of way department of the Gulf, Colorado & Santa Fe, with office at Temple, Tex.

T. J. Metzger has been appointed division accountant of

the transportation and maintenance of way departments of the Wheeling & Lake Erie, with office at Canton, Ohio.

C. O. Hunter, general solicitor of the Hocking Valley, with office at Columbus, Ohio, having resigned that office is abolished. John F. Wilson has been appointed solicitor, with office at Columbus, and he will report to the general counsel.

Daniel Willard, president of the Baltimore & Ohio and the Baltimore & Ohio Southwestern, has been elected also chairman of the board of the Cincinnati, Hamilton & Dayton, succeeding Oscar G. Murray, who remains on the executive committee.

George F. Randolph, first vice-president of the Baltimore & Ohio, at Baltimore, Md., has been elected also vice-president of the Baltimore & Ohio Southwestern, in charge of traffic, and George L. Potter, third vice-president of the Baltimore & Ohio, at Baltimore, has been elected also vice-president of the Baltimore & Ohio Southwestern, in charge of operation and maintenance.

Operating Officers.

J. Cannon, superintendent of the Missouri Pacific-Iron Mountain system at De Soto, Mo., has had his office changed to Poplar Bluff, Mo.

A. J. Bell has been appointed inspector of station service, Wheeling system, of the Baltimore & Ohio, with office at Wheeling, W. Va., reporting to the general superintendent.

L. C. Ullrich, assistant to the general manager of the Southern Railway, at Washington, D. C., has resigned to go to the Scullin-Gallagher Iron & Steel Co., with office at New York.

E. A. Dewey has been appointed superintendent of the Mexico North Western, with office at Chihuahua, Mex., succeeding E. Dimick, resigned to go with the National Railways of Mexico.

C. P. Bemis, trainmaster of the Chicago & Alton at Roodhouse, Ill., has been appointed superintendent of terminals at East St. Louis, Mo., succeeding T. M. Connelly, transferred. The jurisdiction of J. M. Baths, trainmaster at Dwight, Ill., has been extended to Roodhouse.

J. W. Adams, station master of the Baltimore & Ohio at Baltimore, Md., has been appointed inspector of passenger service, with office at Baltimore. Mr. Adams will have supervision over employees in passenger service and the equipment used on such trains, reporting direct to the head of the operative department.

A. K. Stone, trainmaster of the Central division, Isthmian Canal Commission, has been appointed master of transportation of the Panama Railroad, succeeding F. R. Blunt, trainmaster, at Cristobal, Canal Zone, Panama, resigned, and the office of trainmaster has been abolished. The agents heretofore reporting to the general superintendent will in future report to Mr. Stone.

J. Donahue, trainmaster of the Indiana division of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, has been appointed superintendent of the Illinois division, with office at Washington, Ind., succeeding J. B. Carothers, promoted. F. M. Curry, assistant trainmaster of the Ohio division, at Parkersburg, W. Va., succeeds Mr. Donahue, and F. B. Mitchell has been appointed from the general superintendent's office to succeed Mr. Curry.

Traffic Officers.

P. A. Ziegenfuss has been appointed a freight and passenger agent of the Rock Island Lines, with office at Oakland, Cal.

T. T. Herndon has been appointed assistant general claim agent of the Missouri, Kansas & Texas, with office at Greenville, Tex.

W. C. Kilgore has been appointed a commercial agent of the Central of Georgia, with office at Birmingham, Ala., succeeding S. E. Cowin, resigned.

H. S. Mattes has been appointed a commercial agent of the Lehigh Valley, with office at Easton, Pa., and the office of traveling freight agent at that place has been abolished.

G. H. Hitchcock, Jr., has been appointed general freight and passenger agent of the Salt Lake & Ogden, with office at Salt Lake City, Utah, succeeding F. H. Worsley, resigned.

F. A. Brennan, traffic manager of the Licking River Railroad at Cincinnati, Ohio, has been appointed district agent of the Registered Tracer Company, with office at Cincinnati.

J. R. Cahill, city passenger agent of the Chicago, Rock Island & Pacific at Boston, Mass., has been appointed district passenger agent, with office at Pittsburgh, Pa., succeeding L. H. McCormick, promoted.

W. I. Laird, general agent of the St. Joseph & Grand Island at Chicago, has been appointed general agent in the freight department of the Chicago Great Western, with office at Chicago, succeeding J. C. Ilse, deceased.

J. B. Marshel, commercial agent of the Chicago, Milwaukee & St. Paul at St. Louis, Mo., has been appointed commercial agent at Dallas, Tex., succeeding M. F. Smith, resigned to accept service with another company.

E. C. Farrell, auditor, general freight and passenger agent of the Coahuila & Zacatecas, at Saltillo, Coahuila, Mex., has been appointed traffic manager, and the office of general freight and passenger agent has been abolished.

G. W. Quackenbush, having resigned as assistant general freight agent of the Chicago & Alton at Springfield, Ill., that office is abolished, and O. E. George is appointed general agent in charge of freight traffic, with office at Springfield.

George C. Whitney has been appointed a soliciting freight agent of the Queen & Crescent Route, with office at Dallas, Tex. A. C. Valentine has been appointed a traveling freight agent of the Queen & Crescent Route, with office at Dallas, Tex.

William H. Jarvis has been appointed a traveling freight agent of the Baltimore & Ohio, with office at Baltimore, Md., and J. L. Hayes has been appointed a commercial freight agent, with office at Wilmington, Del., succeeding J. Percy White, transferred.

Oscar A. Constans, general freight agent of the Baltimore & Ohio at Pittsburgh, Pa., has been appointed western freight traffic manager, with office at Chicago. He will have general charge of freight traffic of the lines west of the Ohio river and of the Baltimore & Ohio Chicago Terminal Company.

T. J. Walters, commercial freight agent of the Baltimore & Ohio, at Pittsburgh, Pa., has been appointed division freight agent at Pittsburgh, succeeding D. G. Gray, promoted, and N. L. Guilford has been appointed a traveling freight agent, with office at Huntington, W. Va., succeeding J. M. Andrew, resigned.

J. S. McCrea, New England freight agent of the Lehigh Valley at Boston, Mass., has been appointed a commercial agent, with office at Buffalo, N. Y. J. K. Dyer succeeds Mr. McCrea, with office at Boston. R. K. Barton, division freight agent at South Bethlehem, Pa., has been appointed assistant general freight agent, with office at New York, and Oliver M. Barres succeeds Mr. Barton, with office at South Bethlehem.

J. S. Carter, general agent, passenger department, of the Canadian Pacific, at Spokane, Wash., has been appointed city passenger agent at Winnipeg, Man. George A. Walton, district passenger agent at Brandon, succeeds Mr. Carter. J. E. Procter, district passenger agent at Calgary, Alb., succeeds Mr. Walton, at Brandon, and R. G. McNiellie, district passenger agent at Nelson, B. C., succeeds Mr. Procter, with office at Calgary. W. G. Wells, traveling passenger agent at Brandon, succeeds Mr. McNiellie, with office at Nelson.

D. G. Gray, division freight agent of the Baltimore & Ohio, at Pittsburgh, Pa., has been appointed general freight agent in that city, succeeding O. A. Constans, promoted. Mr. Gray was born on May 15, 1869, at Columbus, Ohio, and began railway work as a messenger on the Baltimore & Ohio, November 1, 1887. After serving in various clerical positions in the division freight office at Columbus, he was appointed chief clerk on June 1, 1896, and in July of the following year he

was promoted to chief clerk of the general freight office at Pittsburgh. In June, 1902, he was transferred to Columbus as division freight agent, and since July 1, 1905, was division freight agent at Pittsburgh, from which position he has just been promoted.

Engineering and Rolling Stock Officers.

The office of P. Carroll, division engineer of the St. Louis, Iron Mountain & Southern at De Soto, Mo., has been changed to Poplar Bluff, Mo.

J. B. Carothers, superintendent of the Illinois division of the Baltimore & Ohio Southwestern at Washington, Ind., has been appointed chief engineer maintenance of way, succeeding Earl Stimson, promoted.

Le Grand Parish, superintendent motive power of the Lake Shore & Michigan Southern at Cleveland, Ohio, has resigned to become president of the newly formed American Arch Company, New York.

T. J. Hamilton has been appointed a district master mechanic of the Chicago, Milwaukee & Puget Sound, with office at Deer Lodge, Mont. He will have charge of the line between Harlowton, Mont., and Avery, Idaho.

M. V. Hynes, division engineer of the Cincinnati, Hamilton & Dayton at Indianapolis, Ind., has been appointed acting engineer maintenance of way, with office at Cincinnati, Ohio, succeeding J. Tuthill, assigned to other duties.

R. H. Ford, principal assistant engineer of the Missouri Pacific-Iron Mountain system at St. Louis, Mo., has been appointed assistant to the chief engineer maintenance of way, with office at St. Louis, Mo., succeeding C. J. Welch, resigned. H. E. Hale succeeds Mr. Ford.

W. H. Williams, master mechanic of the Buffalo, Rochester & Pittsburgh, at East Salamanca, N. Y., has been appointed master mechanic of the Middle and Pittsburgh divisions, with office at Du Bois, Pa., and Harry Sneck has been appointed master mechanic of the Buffalo and Rochester divisions, with office at East Salamanca.

A. S. Kent, division engineer of the Chicago, Indianapolis & Louisville at Chicago, has been appointed engineer maintenance of way, with office at Chicago. Anton Anderson has been appointed division engineer of the First and Second divisions, with office at La Fayette, Ind., succeeding W. A. Wallace, resigned.

P. Gratton, roadmaster of the Kansas City Southern at Kansas City, Mo., has been appointed a general roadmaster in charge of the Kansas City terminals and the Northern division, with office at Kansas City. J. Gratton, roadmaster at Neosho, Mo., has been appointed a general roadmaster in charge of the system south of Mena, Ark., including the Texarkana & Ft. Smith Railway, with office at Texarkana, Tex.

James F. DeVoy, mechanical engineer of the Chicago, Milwaukee & St. Paul at Milwaukee, Wis., has been appointed an assistant superintendent of motive power, with office at Milwaukee, and J. J. Connors, district master mechanic at Dubuque, Iowa, has been appointed an assistant superintendent of motive power, with office at Dubuque. Charles H. Bilty, draftsman, succeeds Mr. DeVoy, and Walter Liddell, general foreman in the locomotive department at Dubuque, succeeds Mr. Connors.

OBITUARY.

William A. Hart, division superintendent of the Great Western Railway of England, died recently at London, England, at the age of 65 years. Mr. Hart had been connected with this railway company for more than 50 years.

Charles O. Johnson, vice-president and general manager of the Winona Interurban Railway Co., died recently at Pittsburgh, Pa., of heart disease, at the age of 55 years. Mr. Johnson was formerly in the traffic department of the Chicago Great Western.

Railway Construction.

New Incorporations, Surveys, Etc.

Arizona, Mexico & Gulf.—This company was incorporated in Arizona last month, and locating engineers are now in the field. Arrangements are being made for the early construction of the line. The projected route is from a point west of Winkelman, Ariz., on the Arizona Eastern, southwest to Port Lobos, on the Gulf of California in Mexico, about 210 miles. There is to be a branch from Phoenix southeast, crossing the main line, thence to Silverbell, and another branch from a point on the main line, south of the first branch crossing, northeast to Tucson. The Arizona-Mexico Construction Co., 11 Pine street, New York City, was organized under the laws of Arizona for the purpose of constructing the line. The construction company expects to ask bids for the work in May or June. The line is to connect with the Arizona Southern, but will be built by a separate company. B. P. Cheney, president, 81 Ames building, Boston, Mass.; Victor L. Mason, vice-president, New York. (April 15, p. 1021.)

Arizona Southern.—See Arizona, Mexico & Gulf.

Baltimore & Ohio.—An officer writes that the only extension work to be carried out by this company along Lost Creek valley, W. Va., will be a single-track line, one mile long, to the mine of the Upper Lehigh Coal Co.

Boston & Maine.—See New York, New Haven & Hartford.

Brownwood Southwestern.—An officer writes that grading contracts are to be let May 1 and construction is expected to be started in about 30 days. The projected route is from Brownwood, Tex., southwest to Rockwood, 30 miles. The route has not yet been definitely located. The company will carry out the track laying with its own men. There will be three trestles. R. A. Love, president, and A. B. Carson, engineer, Brownwood.

Canadian Pacific.—See an item in regard to this company in Railway Financial News.

Cheat River & Monongahela Valley.—An incorporator writes that this company was chartered in West Virginia to build from near Albright, Preston county, W. Va., northwest to the West Virginia-Pennsylvania state line at a point near Cheat Haven, Pa., about 20 miles. The company is not ready to give out additional information at the present time. E. N. Lantz, Kingwood, W. Va., may be addressed.

Chicago & Northwestern.—See Wisconsin Roads.

Chicago, Burlington & Quincy.—The main line between Galesburg, Ill., and Bushnell, 25 miles, will be double-tracked this year. Work was begun last fall on the building of 50 miles of double track on the La Crosse division, which extends from Savanna, Ill., to St. Paul, Minn., and this 50 miles will be finished this year.

Coos Bay, Oregon & Idaho.—An officer writes that the first 100 miles has been located from Marshfield, Ore., on Coos bay, east to Roseburg. The line is eventually to be extended east to Boise, Idaho. Grading contracts will not be let before July of this year. The line will cross the coast range with a 1 per cent. grade and 6 per cent. maximum curvature. Part of the work will be heavy rock work, with several short tunnels. On the first section of 100 miles the line will pass through heavy timber lands and coal fields. H. Clarke, president; F. A. Haines, chief engineer, Marshfield.

Easton & Washington Traction Co.—See Northampton Traction Co.

Elgin, Joliet & Eastern.—This company is to double-track its line from Joliet, Ill., east to South Chicago. The yards at Joliet are to be enlarged and additional car shops and coal chutes put up. Extensive improvements will also be made at Waukegan.

Grand Trunk.—According to press reports, surveys are now being made by the Southern New England Railway Company for the proposed line from Palmer, Mass., southeast to Providence, R. I., and plans for the terminals are being made. (April 15, p. 1015.)

Gulf Coast & Provident City.—The Railroad Commission of Texas has authorized this company to issue bonds to pay

for the first 31 miles of line north from Pierce, Tex., which is on the Southern Pacific. Contracts have been let and grading is to be started probably in June on a line from Pierce, north to a connection with an east and west line to be built from Glen Flora, on the Gulf, Colorado & Santa Fe, west to Provident City. Emil Reinbold, chairman and president, Kansas City, Mo. (April 8, p. 970.)

HUDSON & MANHATTAN.—An officer writes that the only work now being carried out in the borough of Manhattan by this company is on the extension of the subway from Twenty-seventh street, under Sixth avenue, to Thirty-third street, with stations at Twenty-eighth street and Thirty-third streets. The work is being done by the Degnon Contracting Co. (Sept. 3, p. 426.)

An officer is quoted as saying that it is expected to open the extension from Twenty-third street to Broadway and Thirty-third street about October 1. The station at Thirty-third street will be about 800 ft. from the great new station of the Pennsylvania. When this part of the work is finished the company will be in a position to proceed with the construction of the extension north and east to the Grand Central Terminal at Forty-second street and Fourth avenue, for which a franchise was secured in May, 1909. The majority of the property owners' consents have been obtained. Regarding the proposed line to Newark, N. J., over the Pennsylvania's tracks the Hudson & Manhattan will have very little construction work to do. By agreement with the Pennsylvania through trains are to be run between the Hudson Terminal station in Manhattan and the Pennsylvania station in Newark. The agreement provides that the Hudson & Manhattan will furnish the track facilities between the Hudson Terminal and Summit avenue, Jersey City, from which point the tracks of the Pennsylvania will be used to Newark.

INTERCOLONIAL.—An officer writes that the contract recently let for a branch between Georges river, N. S., and Sydney Mines, 9.09 miles, was given to D. G. Kirk, Antigonish, N. S. The work will be light. Maximum grades will be 1 per cent.; maximum curvature, 3 degrees. There will be three steel bridges. (Apr. 8, p. 970.)

LEHIGH VALLEY.—According to press reports, this company will start work soon on a classification yard at Hazel Creek Junction, Pa., a short distance from Weatherly.

MAINE CENTRAL.—A contract has been given to the Fletcher-Lahey Co., Boston, Mass., for the elimination of the Raines hill crossing in Augusta, Me., and work is now under way. The cost of the improvements for abolishing this dangerous grade crossing is to be paid for as follows: The city of Augusta and the Lewiston, Augusta & Waterville Street Railway are each to pay 15 per cent., not exceeding $15,000; the state of Maine to pay 25 per cent., not exceeding $25,000, and the Maine Central will pay the rest of the cost.

NEW YORK CENTRAL & HUDSON RIVER.—An officer writes that the only improvement now being carried out at Utica, N. Y., is in connection with the elimination of the Genesee street crossing.

NEW YORK, NEW HAVEN & HARTFORD.—An officer writes that an investigation of the line from New Haven, Conn., northeast to Middletown is being made, with a view to future double-tracking. The construction of the new bridge over the Connecticut river at Middletown has been authorized, and work will be started in the near future. Regarding the new construction work to be carried out on the Boston & Maine in Vermont, to complete the line north to Sherbrooke, Que., we are told that the New Haven now has a through line to Sherbrooke. The lines now being surveyed will give it a line under its own control. The present route is over a 10-mile section between South Vernon and Brattleboro, belonging to the New London Northern, which is a part of the Central Vermont, and a 14-mile section between Windsor and White River Junction, owned by the Central Vermont. The construction of new lines on these two sections will enable the line to be handled much more efficiently and economically. (April 15, p. 1016.)

NEW YORK SUBWAYS.—Public hearings are to be held by the New York Public Service Commission, First district, on May 9 and 16, on the forms of contracts for the construction of new subways.

NORTHERN PACIFIC.—According to press reports, a general contract has been given to Guthrie & Co., St. Paul, Minn., to build from Pingree, N. D., west to Wilton, about 90 miles. Sub-contracts are said to be let to Edward Sweringen, New Salem, N. D., and to James Tobia, Seattle, Wash., which calls for the completion of the work by October 1. Track laying and bridge building will follow the completion of the grading work as rapidly as possible. (Oct. 29, p. 828.)

NORTHAMPTON TRACTION CO.—This company, operating a line from Easton, Pa., north via Nazareth to Bangor, with connections to Portland, is planning to build a four-mile extension from Portland north to the Delaware Water Gap. Such a line would complete electric line connections from Philadelphia north to Stroudsburg. Arrangements are said to be made to consolidate this company with the Easton & Washington Traction Co., which operates a line from Phillipsburg, N. J., northeast to Port Murray, 18 miles, and proposes to extend east, to obtain connections across the state of New Jersey to Jersey City.

OKLAHOMA CITY & SUBURBAN (ELECTRIC).—An officer writes that contracts have been let to John Alley and to Matt Corrigan, both of Oklahoma City, Okla., to build lines in Oklahoma City, also from Britton, north to Edmund, and from a point between Oklahoma City and Greeley, south to Moore. Track has already been laid on 10 miles. W. A. Haller, Oklahoma City, may be addressed.

OKMULGEE & COALTON.—Incorporated in Oklahoma with $50,000 capital and office at Okmulgee, Okla. The company plans to build from Okmulgee to Coalton, about eight miles. The estimated cost of the line is $150,000. The directors include: W. J. Cook, Muskogee; C. S. Dawley, N. D. Boyd, T. J. Baker, Walter W. Martin, E. F. Gill, A. F. Seidler, Leo O. Voorhis, G. W. Mecklin, A. D. Kennedy, John A. Belford and R. D. Carpenter, all of Okmulgee.

OREGON SHORT LINE.—An officer writes that surveys have been made for an extension of the present second-track from Salt Lake City, Utah, north to Farmington, but it is undecided whether this work will be carried out during 1910.

The Salt Lake & Idaho was recently incorporated to build from a point on the Ogden-Lucin cut-off at Saline, Utah, north to Minidoka, to connect with the Oregon Short Line, about 150 miles. An officer writes that the projected route has not been definitely decided upon, and it is uncertain when the line will be built. (Apr. 1, p. 919.)

Work is now under way by the Utah Construction Co., Ogden, Utah, on a short branch from Vail, Ore., northwest to Brogan, 23.8 miles, and it is expected to have the work finished in the near future. An officer writes regarding the report that plans were made by the Southern Pacific to build from Vail, southwest to Klamath Falls, 260 miles, air line, that there is no prospect of doing any work in the immediate future on such a line. If an extension is built from Vail, westerly into central Oregon, it will be over an entirely different route from the line now under construction to Brogan. (Dec. 10, p. 1168.)

OSWEGO, COLUMBUS & CHERRYVALE (ELECTRIC).—Organized in Kansas, with $50,000 capital and office at Oswego, Kan. The plans call for a line from Columbus west to Cherryvale, 47 miles. S. B. Miller, Oswego; D. Christman, W. J. Jones, G. Torbert, Altamont; D. Dunbar, Hallowell, and G. A. Mitchell, Cherryvale.

PAYETTE VALLEY.—A contract is said to have been given to the Western Engineering Co., Emmett, Idaho, to build the 19-mile extension in Idaho. The company operates a 13-mile line from Payette, Idaho, southeast to New Plymouth. (March. 25, p. 850.)

PENNSYLVANIA.—See Hudson & Manhattan.

PENSACOLA & SOUTHWESTERN.—Organized in Louisiana, with $50,000 capital, to build from Millview, Fla., west via Lillian, Ala., to Point Clear, on Mobile bay, about 40 miles. The in-

corporators include: C. Barclay, Lillian; J. MacDonald and W. D. Stapleton, Bay Minette, Ala.

Portland, Eugene & Eastern (Electric).—According to press reports, financial arrangements have been made to build an extension through Eugene, Ore., thence east to McKenzie valley. It is expected that work will be started soon on the first section of a line between Eugene and Salem, as far north as Junction City, about 15 miles. The project to build a five-mile loop line around College hill, in the Southern part of Eugene, has been abandoned for the present, but may be taken up later on. Work is now under way by L. N. Roney on a large bridge over the Williamette river at Springfield, and a large power plant is being put up at Martins Rapids on the McKenzie river. (Jan. 28, p. 209.)

Quanah, Seymour, Dublin & Rockport.—Incorporated in Texas with $500,000 capital and office at Austin, Tex. The plans call for a line from the Texas-Oklahoma state line, five miles north of Quanah, southeast via Austin to Rockport, on the gulf coast, about 500 miles. The directors include: L. E. Walker, Marshall; W. R. Davie, H. E. Ford and A. J. Eilers, Austin; H. Koch, Quanah; G. S. Plants, Seymour: C. G. Johnson, Rockport, and M. C. Witchur, Dallas. Bonuses aggregating several hundred thousand dollars are said to have been subscribed in aid of the proposed line by residents of towns along the route.

St. Louis & San Francisco.—A grading contract is said to have been given to Kahmann & McMurray, and work is to be started at once on the Menardville end of the extension being built from Brady, Tex., southwest to Menardville, about 30 miles. It is expected to have the line opened by January, 1911. (March 11, p. 547.)

Salt Lake & Idaho.—See Oregon Short Line.

San Antonio & Aransas Pass.—This company has about finished the new grade from Altair, Tex., east to the Colorado river. This change was made necessary to reach the new bridge which is to be built over the river. The old bridge has been bought by the county and will be converted into a highway bridge. (See Altair, under Railway Structures, March 25, p. 853.)

San Diego & Arizona.—The Publicity committee of the Panama-California Exposition at San Diego, Cal., writes that surveys have been made by the San Diego & Arizona from the shores of San Diego bay east to the interior of the Imperial valley, about 150 miles, to which point it is expected to have the line in operation by 1911. An extension is to be built east to Yuma, Ariz., where connection will be made with the Southern Pacific, in all 220 miles. Track has been laid from San Diego south for 17 miles along the coast via Tia Juana to a point in Mexico, at the first crossing of the Tia Juana river, at which place a bridge is now being built. This bridge is to have a total length of 1,050 ft., with a ballasted deck structure on creosoted piling. The line is then to run southeasterly 10 miles to a point seven miles south of the international boundary, then through Matanuco canyon, continuing northeasterly 32 miles to a point near the east end of the Tecata valley, where it will recross the international boundary into California. From this point the route parallels the international boundary to the Jacumba valley, then runs north about 12 miles, thence down the Carrizo canyon and easterly to Imperial valley. There will be some long tunnels, including one stretch of 50,000 ft. in the mountain section, and a large number of bridges. In addition to the long bridge at the first crossing of the Tia Juana river there will be a steel viaduct at the second crossing, with concrete piers, 510 ft. long and 60 ft. above the river bed at the highest point. A mile east of this viaduct a similar structure will be put up, 180 ft. long, and in this section two tunnels are to be bored, one of which is to be 200 ft. long and the other 325 ft. long. The surveys for the line have cost $200,000 and over $1,000,000 has been paid for the right-of-way. It is expected to have the line finished to Yuma by 1913. The estimated cost of the line is $7,500,000. (Dec. 24, p. 1262.)

San Luis Southern.—This road has been finished on the first section from Blanca, Costilla county, Colo., to a point in southern Colorado. The line is to be extended south to Santa Fe, N. Mex. An extension is projected east to Trinidad, about 40 miles. L. D. Blauvelt, general manager and chief engineer, Blanca. (July 30, p. 215.)

Sioux Falls & Western.—According to press reports from Sioux Falls, S. D., surveys for this line will be started at once. The projected route is from Sioux Falls, west to Wheeler in Charles Mix county, on the Missouri river, about 125 miles. R. F. Brown and G. T. Blackman, Sioux Falls, are incorporators. (Mar. 18, p. 751.)

Southern New England.—See Grand Trunk.

Southern Pacific.—See Oregon Short Line.

Spokane International.—The Coeur d'Alene & Pend d'Oreille has been incorporated in the state of Washington with $600,000 capital and office at Spokane, Wash. The plans call for lines as follows: From the Spokane International near section 23, township 51, range five, west; southeasterly to Coeur d'Alene lake, and another line from section 33, township 53, range 3, west, 15 miles to Pend d'Oreille lake, also other branches and extensions in Idaho, Montana and Washington. The incorporators are: Austin Corbin, Albert Allen and George H. Martin.

Temiskaming & Northern Ontario.—An officer is quoted as saying that plans have been made for extensions and improvements. Contracts are to be let soon for new bridges. A new steel bridge is to be built to replace the present structure at Wild Goose. Double-tracking work is now under way between Cobalt, Ont., and North Cobalt, and new stations are to be put up at Matheson and at Cochrane. (Feb. 25, p. 429.)

Vancouver, Tabasco & Campeche Railway Construction Co.—Organized to build the proposed line from Santa Lucretia, Mex., at the junction of the Vancouver & Isthmus and the Tehuantepec National railways, to Campeche, Yucatan, at the western terminus of the United Railways of Yucatan, for which concession has been granted by the federal government. A company is also being organized under the laws of New Jersey by New York and London capitalists to finance the project. The company will have nine years in which to complete the line. A branch may be built to San Juan Bautista, and another from some point on the main line north to the port of Coatzacoalos. The organizers of the construction company are residents of Mexico and include: D. Chapeaurouge, J. J. Lemmens, J. W. Johnstone, L. Van Antwerp, K. Heynan, William P. Wood and some of the people identified with S. Pearson & Sons, Ltd. (April 1, p. 918.)

Western Washington Railway & Navigation Co.—Surveys are said to be made from Aberdeen, Wash., northeast to Colby, 78 miles. C. C. Quackenbush, president, Aberdeen.

Wisconsin Roads.—John J. O'Heron & Co., Chicago, has been given a contract for permanent work on the Galena, Madison, Iowa and the I. & M. divisions of the Chicago & Northwestern. There are 55 structures on this work and the contract includes pile driving, excavation, piers and culverts.

The new line short line for the Chicago & North Western to Minneapolis, Minn., and St. Paul, via Milwaukee, Wis., is to be built to relieve congestion on the Wisconsin divsion. The line will be 177 miles long, involving the laying of about 220 miles of track. From the Northern Wisconsin division at a point near Lake Michigan, eight miles north of Milwaukee, a double-track line will extend northwest about 43 miles to Clyman, which is on the line between Fond du Lac and Janesville. A double-track connection, eight miles long, will be made to the Madison division directly west of Milwaukee. From Clyman a single-track line will be built northwest to the eastern end of the Necedah branch, about 90 miles, and the branch from Necedah to Stowell, which is 13 miles, will be reconstructed and form part of the new line. From Stowell a single-track 23-mile line will be laid west to Sparta, on the main line, to the northwest. All the bridges and waterway openings are to be of permanent construction. The tracks will be laid with heavy steel, and will be heavily ballasted. (April 8, p. 969.)

Railway Financial News.

Buffalo & Susquehanna.—A protective committee, consisting of William Salomon, chairman; Gordon Abbott, Alexander Brown, Harvey E. Fisk, Benjamin Strong, Jr., Asa S. Wing, with H. G. Henry, secretary, has been formed. The committee asks holders of the first mortgage 4½ per cent. bonds of 1903 to deposit their bonds with the Bankers' Trust Co., New York. If a reorganization plan is prepared, depositing bondholders will be given three weeks in which to withdraw their bonds if they disapprove of the plan. The Buffalo & Susquehanna is one of the properties in which Fisk & Robinson, who failed recently, were largely interested.

Canadian Pacific.—The $37,000,000 realized from the sale of new stock is to be used for double-tracking existing lines, enlarging stations and general improvements, and not for building new mileage. The 600 miles of new single-track now being built is to be paid for from the sale of the debenture stock.

Chicago, Milwaukee & St. Paul.—A press despatch from St. Joe, Idaho, says that the Milwaukee Land Co., which is a subsidiary of the C., M. & St. P., bought timber lands in Washington, along the line of the Pacific coast extension before this road was built, paying in the neighborhood of $12,000,000 for them, and that these lands are now worth in the neighborhood of $30,000,000. The Milwaukee Land Co. is the holding company for all of the land owned by the St. Paul, but outside of this timber land in Idaho and Washington these holdings are not extensive. Of the stocks and bonds owned, carried on the balance sheet at $115,000,000, it is supposed that $100,000,000 is accounted for by first mortgage bonds of the Chicago, Milwaukee & Puget Sound.

Cincinnati, Hamilton & Dayton.—Harry Bronner has been elected a director to represent the 4½ per cent. noteholders, succeeding H. S. Redmond, deceased.

Grand Trunk Pacific Branch Lines.—The Grand Trunk is offering in London £1,270,500 ($6,352,500) 4 per cent. first mortgage bonds, due 1939, of the Grand Trunk Pacific Branch Lines Co., guaranteed principal and interest by the province of Saskatchewan. The offering price is £98 10s. per £100 bond, or 98½.

Kansas City, Mexico & Orient.—P. H. McMillan has been elected a director of the Kansas City, Mexico & Orient.

Lake Shore & Michigan Southern.—*The Commercial and Financial Chronicle* says that the total amount of Lake Shore notes recently sold in Paris was $8,500,000. The notes run for less than one year and bear interest at 4 per cent.

Metropolitan Street Railway (New York).—The property is advertised to be sold under foreclosure of the general collateral trust mortgage on May 12. The upset price is fixed at $10,000,000.

Northern Pacific.—The Northwestern Improvement Co. has filed a certificate in New Jersey showing that $6,775,000 capital stock has been paid in. The Improvement company was incorporated a number of years ago. All its stock is held by the Northern Pacific. It was from the profits of this Improvement company that 11.26 per cent. extra dividend was declared in 1908 on Northern Pacific stock. The *Wall Street Journal* says that contrary to common belief, the property assets of the Improvement company were not touched when the big distribution was made, and that the Improvement company now holds valuable coal properties and some timber and other lands.

Southern Railway.—George F. Baker, Jr., has been elected a director, succeeding James T. Woodward, deceased.

Terminal Railroad Association of St. Louis.—At the annual meeting the following new directors were elected: C. S. Clarke, to succeed A. G. Cochran; C. R. Gray, St. Louis & San Francisco, to succeed A. J. Davidson; W. L. Park, Illinois Central, to succeed I. G. Rawn, and F. O. Melcher, Rock Island, to succeed H. U. Mudge.

Wabash-Pittsburgh Terminal.—Pittsburgh holders of the first mortgage bonds say that they intend to form a protective committee to look out for the interests of the first mortgage Wabash-Pittsburgh Terminal bonds, independently of the committee of which the president of the Central Trust Co. of New York is chairman. The Pittsburgh bondholders have sent out a circular letter saying that they intend to employ counsel and to ask other bondholders to agree to a first assessment of 1¼ per cent. to defray expenses. The circular letter calls attention to the fact that the first mortgage bonds are "fully secured by traffic and trackage contracts between the Wabash Railroad, the Wheeling & Lake Erie and the Terminal Company."

"The Central Trust Co., as the trustees of $12,000,000 of alleged outstanding general mortgage bonds of the Wheeling & Lake Erie that are held in the interest of the Wabash Railroad as collateral for $8,000,000 of notes of the Wheeling & Lake Erie, originally guaranteed and now owned by the Wabash, is claiming in the pending proceeding that the trackage and traffic agreements above referred to are subject to this mortgage, and is not only seeking to deprive the Wabash Terminal first mortgage bondholders of the security of these agreements, but to cut out the stock ownership of the Wheeling Co. by a foreclosure.

"The president of the Central Trust Co. is, as you know, the chairman of the first mortgage bondholders' committee, and the distinguished counsel who are advancing the claim of the Central Trust Co. that the first mortgage bondholders are not entitled to the security of these agreements and are seeking to cut out the stock ownership in the Wheeling Co., are the same as the counsel for the bondholders' committee, whose duty it is to sustain those agreements and protect in every way the interests of the Terminal bondholders.

"In calling attention to this manifest inconsistency, we do not for a moment intend to reflect upon any of these eminent gentlemen. We are merely performing an unpleasant duty in explaining our reason for having reached the conclusion that there should be independent action, which we have no doubt will be quite a relief to the bondholders' committee. * * *"

The Railway Law of Costa Rica.

On December 8, 1909, the President of Costa Rica promulgated the railway law, which provides that no railway for the transportation of passengers and freight shall be built in the Republic without the consent of the congress, and that on the expiration of a railway concession, which in no case shall be granted for a longer term than 99 years, the entire railway, including rolling stock, buildings and grounds, shall become the property of the nation. All railway concessions are subject to the laws and regulations of Costa Rica now in force or which in future may be enacted, and no foreign contractor shall have the right to appeal to any laws other than those of Costa Rica in the settlement of any disputed questions that may arise in the construction, exploitation or management of the railway. No railway concession shall confer a monopoly upon any railway company, and the state reserves the right to parallel any railway for which a concession has been granted. Nevertheless, the concession may prohibit the construction of a parallel railway within certain limits for a period of ten years.

The sale or transfer of a railway concession before becoming valid is subject to the approval of the congress. In no case shall a railway concession, railway, telegraph or telephone line be sold, mortgaged or leased to any foreign power, nor shall a foreign government become a partner or owner of the stock or bonds of any railway company.

Companies or persons desiring to secure a railway concession must apply to the secretary of fomento, accompanying the application with a general plan or sketch of the line, showing the length of the road, the bridges, stations, culverts, etc., to be constructed, and the estimated cost of the road, all of which shall be subject, in case the concession is granted, to modification by the government. All railways operating in the Republic, whether organized abroad or not, are considered Costa Rican companies, and are subject to the laws of the land. The law provides for government inspection of railways, and specifies the manner in which freight and passenger tariffs shall be issued.

Supply Trade Section.

The McKeen Motor Car Co., Omaha, Neb., is building a 70-ft. motor car for the Pennsylvania.

The Isthmian Canal Commission will receive bids until June 27 for one steel ladder dredge. (Circular No. 575.)

The Chicago Bearing Metal Co., Chicago, has moved its office to rooms 520 and 521 in the new McCormick building, Michigan avenue and Van Buren street.

The Pyle-National Electric Headlight Co., Chicago, will, after April 23, be located in the new McCormick building, Michigan avenue and Van Buren street.

The Standard Steel Car Co., Pittsburgh, Pa., is building two new steel buildings at its plant at Ellwood City, Pa. They are to be respectively 80 x 340 ft. and 50 x 300 ft.

The Chicago office of the coupler department of the National Malleable Castings Co., Cleveland, Ohio, has been moved from the Old Colony building to 311 Railway Exchange.

The Hale & Kilburn Manufacturing Co., Philadelphia, Pa., will, on May 1, move its Chicago office from the fourteenth floor of the Fisher building to room 817 of the same building.

The Chicago sales office of the Railway Steel-Spring Co., New York, at the present time located at 1380 Old Colony building, will, after May 2, be at 1111 Peoples' Gas building.

Geo. E. Molleson Co., New York, has been appointed exclusive sales agent for the Tyler Tube & Pipe Co., Washington, Pa., to the railways east and south of the Ohio river.

The Interborough Rapid Transit Co., New York, has placed an order with the Westinghouse Traction Brake Co., New York, for electric pneumatic brakes to equip its subway express cars.

The Ingersoll-Rand Co., New York, has received an order from the Pittsburgh Contracting Co. for an equipment of air compressors and rock drills for use on section 53 of the Catskill aqueduct, New York.

C. H. Rhodes, for several years in the purchasing department of the American Steel & Wire Co., Chicago, at Pittsburgh, Pa., has been appointed purchasing agent for the company, with office in Chicago.

The Sherwin-Williams Co., Cleveland, Ohio, will, on May 1, move its city and railway sales offices from the Railway Exchange building, Chicago, to room 804 of the new Steger building, 39 Jackson boulevard.

The Norton Grinding Co., Worcester, Mass., has ordered six induction motors, two 7½-h.p. motors, three 10-h.p. and one 40-h.p. motor, three 100-k.v.a., 13,200-volt, 460-volt transformers from the Crocker-Wheeler Co., Ampere, N. J.

The Ostermann Manufacturing Co., West Pullman, Ill., announces that the name of the company has been changed to the West Pullman Car Works. The company will continue to build and repair wood and steel freight car equipment.

The Dearborn Drug & Chemical Works, Chicago, will, on May 1, move its general office and laboratory from the Postal Telegraph building to the 20th floor of the new McCormick building, Michigan avenue and Van Buren street. The company is sending out neat printed announcements of this change.

The Crocker-Wheeler Co., Ampere, N. J., has just sold to the Illinois Steel Co. the following electrical equipment: Four 110-h.p., compound-wound, d.c. motors; two 500-k.w. synchronous motor generator sets; fifty-one 25-h.p., series wound mill motors; twenty-six 50-h.p., series wound mill motors; five 12½-h.p., shunt-wound motors, and eighteen 25-h.p., shunt-wound motors.

J. M. Betton, New York, has purchased the interest in the patents, manufacture and sale of the injector sand blast apparatus, formerly owned by C. Drucklieb, New York. Mr. Betton has, for the past five years, managed this branch of the business, and he will continue the manufacture and sale of these machines. All standing accounts due Mr. Drucklieb should be referred to Mr. Betton.

Brown Brothers Co., Philadelphia, and Kuhn, Loeb & Co., New York, have concluded negotiations for the disposal of $10,000,000 first mortgage 30-year 5 per cent. bonds of the Baldwin Locomotive Works. These bankers recently underwrote the $3,000,000 bond issue of the Standard Steel Works Co., Philadelphia. The proceeds of the present sale are to be used to pay floating debt and provide additional working capital.

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., announces that on account of the rapid growth in its cement testing department, it has recently opened cement laboratories at 511 Omaha building, Chicago, and at 309-10 Praetorian building, Dallas, Tex. This company has cement laboratories at Easton, Pa.; Pittsburgh, Pa.; Cincinnati, Ohio; Birmingham, Ala., and San Francisco, Cal., as well as cement chemists located at a large number of the different cement mills, and it is prepared to test cement either in its own laboratories or to make mill inspection of cement at cement mill.

L. C. Ullrich has resigned as assistant to the general manager of the Southern Railway to accept a position in the sales department of the Scullin-Gallagher Iron & Steel Co., St. Louis, Mo. Mr. Ullrich was born at St. Louis, Mo., on December 30, 1878, and entered railway service with the Denver & Rio Grande at St. Louis as a clerk in the general agent's office in March, 1894. In 1898 he was appointed chief clerk, which position he held until 1901. During the following year he was secretary to the general manager of the Mobile & Ohio at St. Louis, after which he became secretary to the vice-president and general manager of the Southern Railway, and later chief clerk to the same officer, which position he has just resigned to enter the sales department of the Scullin-Gallagher Iron & Steel Co. Mr. Ullrich will have headquarters at No. 1 Wall street, New York.

Le Grand Parish, superintendent motive power of the Lake Shore & Michigan Southern, has resigned to accept the presidency of the American Arch Company, New York. Mr. Parish has been in the service of the Lake Shore for many years and has served as superintendent motive power on that line since early in 1906. He needs no introduction to the readers of the *Railway Age Gazette*. His steady climb from storekeeper of the Lake Shore at Adrian, Mich., in 1891, to superintendent of motive power is a record that speaks for itself. He is second vice-president of the Master Car Builders' Association, with which he has been actively identified for many years, and in whose interest he has labored most effectively. He has also been active in the work of the Master Mechanics' Association and of the Western Railway Club, having served a term as president of the latter organization. Mr. Parish has had wonderful success in the handling of men, and is one of the best organizers among the railway officers of this country. The splendid organization of the motive power department of the Lake Shore is due largely to his personality and methods. The American Arch Company is a newly organized corporation and will make and sell locomotive arch brick. The company controls most, if not all, of the improved patented forms of arch brick, which have heretofore proven mechanically and commercially successful. The new corporation will hereafter conduct the arch brick business previously done by the American Locomotive Equipment

Le Grand Parish.

Company, Chicago, and the arch account handled up to this time as a department of the Franklin Railway Supply Company, New York. The officers of the American Arch Company are as follows: J. S. Coffin, chairman; Le Grand Parish, president; Charles B. Moore, vice-president; Samuel G. Allen, secretary and treasurer. The principal office of the company will be at 30 Church street, New York, with branch offices at: McCormick building, Chicago; 326 Endicott building, St. Paul, Minn.; 2318 Harney street, Omaha, Neb.: 327 Majestic building, Denver, Colo.; 2319 Budlong avenue, Los Angeles, Cal., and 795 Monadnock building, San Francisco.

March returns of the Western Electric Co., New York, show an increase of approximately 40 per cent. over March, 1909, and with one or two exceptions, this month was the largest March the company has experienced. The spring peak is attained in the quarter which includes March, April and May, and the fall peak in the quarter which includes September, October and November. Up to April 14 the fiscal year ending in 1910 showed a gain of about 45 per cent. over the corresponding period of a year ago. The officers of the company report that the improvement is well distributed between the associated Bell companies and outside operating companies, and that the electric light supplies and machinery branches are coming in for their share of the increased sales. Telephone apparatus and cable sales are about 25 per cent. ahead of the same period in 1909. The gains are well distributed geographically, indicating a fundamental prosperous condition of the country at large.

TRADE PUBLICATIONS.

Air Tools.—The Independent Pneumatic Tool Co., Chicago, has issued a four-page folder illustrating the Thor drills, grinders, wood-boring machines and pneumatic hammers.

Steel Furniture.—The O. M. Edwards Co., Syracuse, N. Y., has just issued a leaflet describing the steel furniture which it manufactures, including combination cabinets, steel bond boxes, etc.

Bolt, Nut and Forging Machinery.—The Acme Machinery Co., Cleveland, Ohio, has just issued a new catalogue for 1910 containing a large number of half-tone illustrations, general specifications and prices of its bolt, nut and forging machinery.

Chicago, Burlington & Quincy.—Two folders just issued by the Chicago, Burlington & Quincy describe the Yellowstone National Park and the means available for tourists to see the important points in a short trip. A large map of the park and a table of various tours with complete costs from points east are included.

Union Pacific.—"Railroad Signaling" is the title of a booklet issued by the passenger department of the Union Pacific. It is artistically made up, printed on heavy glazed paper, contains 20-full page illustrations in color and is bound in a neat embossed cover. The description covers all the devices for safeguarding train operation that are in use on the Harriman lines, and is written in an interesting style.

Chicago, Burlington & Quincy.—The passenger department of the Burlington Route has issued a booklet on the irrigated lands in the Billings and Sheridan district of Montana and Wyoming, which contains much of interest to the man who is looking for a farm in a good agricultural region or a business investment in a town. Another pamphlet gives similar information concerning the Big Horn Basin in Wyoming.

RAILWAY STRUCTURES.

ALTAIR, TEX.—See San Antonio & Aransas Pass under Railway Construction.

BLANDON, PA.—Improvements are to be made by the Philadelphia & Reading, it is said, eliminating two grade crossings at a point west of Blandon. This is to be accomplished by putting up a three-span bridge, the work to be carried out by the American Bridge Co.

BUTTE, MONT.—Plans are said to be made by the Northern Pacific to put up a steel and concrete viaduct from South Butte to the flat. The cost of the proposed structure will be $16,000.

CARTERET, N. J.—A recent fire destroyed about 300 ft. of the bridge over the Rahway river on the Sound Shore branch of the Central Railroad of New Jersey, about a mile east of Carteret.

CLEVELAND, OHIO.—On officer of the Lake Shore & Michigan Southern writes regarding the reports that a union passenger station is to be put up in Cleveland, that the reports are premature. Negotiations with the city of Cleveland have not yet been completed, in particular, with reference to the prices which the railway companies interested will pay to the city for the land needed for the site.

COCHRANE, ONT.—See Temiskaming & Northern Ontario under Railway Construction.

FORT WILLIAM, ONT.—The Canadian Pacific, it is said, will double the capacity of its shops at Fort William. This is to be accomplished by adding a structure, 70 ft. x 128 ft.

HOUSTON, TEX.—Plans for the new Southern Pacific office building, to be nine stories high, at Franklin and Travis streets, in Houston, are being made. It is thought that bids will be asked for the work about June 1.

MATHESON, ONT.—See Temiskaming & Northern Ontario under Railway Construction.

MIDDLETOWN, CONN.—See New York, New Haven & Hartford under Railway Construction.

MILLEN, GA.—The Central of Georgia is to build a new station, 40 ft. x 184 ft., at a cost of $12,000. The work is to be done by company forces.

MONTREAL, QUE.—An officer of the Canadian Pacific writes that the company is about to make large improvements at the east end station, Place Viger, including rearrangement of the passenger station tracks and facilities, as well as of the present freight shed arrangements, covering the construction of inward and outward sheds, each 1,000 ft. long, having six tracks and transfer platform between them. (April 8, p. 969.)

NEW CASTLE, IND.—An officer of the Lake Erie & Western writes that a plan is being considered to abandon the present union station used by the Lake Erie & Western and the Pennsylvania and to build separate stations in a more central location. If the plans are adopted, the Lake Erie & Western will build a modern station of brick or frame about 30 ft. x 100 ft. Plans and estimates are now being prepared, but no decision has yet been reached.

NEW YORK.—See Hudson & Manhattan under Railway Construction.

RAYMOND, WASH.—See Seattle, Wash.

SEATTLE, WASH.—The Northern Pacific has let a contract to the Puget Sound Bridge & Dredging Co., Seattle, Wash., for building a concrete and steel bridge over the west waterway. Contracts have also been let to Alexander Pierson, Seattle, Wash., for a steel bridge at Snohomish, Wash., and for another over the Willapa river at Raymond, Wash.

SNOHOMISH, WASH.—See Seattle, Wash.

SPRINGFIELD, ORE.—See Portland, Eugene & Eastern (Electric) under Railway Construction.

STRATFORD, ONT.—An officer of the Grand Trunk writes that no definite arrangements have yet been made for improvements to be made at Stratford. (April 15, p. 1020.)

SUPERIOR, WIS.—Announcement has been made by the Minneapolis, St. Paul & Sault Ste. Marie that work will begin at once on a large ore dock.

TEMPLE, TEX.—The Gulf, Colorado & Santa Fe has had plans prepared for new freight offices and warehouses to be built at the foot of Main street, north of the present freight offices. The new office building is to be two stories high, 32 ft. x 52 ft. The warehouse will be 32 ft. x 220 ft., and will have concrete floors and platforms and rolling steel doors. Duplicate freight transfer sheds, 32 ft. x 234 ft., will connect with the warehouse, a single team track separating the two.

TOLLAND, COLO.—The roundhouse of the Denver, Northwestern & Pacific was burned on April 12. The building was a total loss, and a Mallet locomotive and a snow-plow which were in the building at the time were also considerably damaged.

Late News.

The items in this column were received after the classified departments were closed.

H. R. Safford, chief engineer maintenance of way of the Illinois Central, at Chicago, has resigned.

The Akron & Barberton Belt Railroad, Pittsburgh, Pa., has ordered one heavy switching locomotive from the Baldwin Locomotive works for delivery this summer.

M. J. Herrick has been appointed to the new position of general superintendent of freight transportation of the New York Central lines west of Buffalo, N. Y., with office at Chicago.

Harry L. Wyand has been appointed district passenger agent of the Chicago Great Western, with office at Cleveland, Ohio, succeeding Frank R. Mosier, resigned to go into other business.

The funeral of G. T. Hayes, of the advertising department of the Duntley Mfg. Co., Chicago, who died on April 17 of heart trouble, was held in Omaha, Nebr., on Wednesday of this week.

The Algoma Central & Hudson Bay has extended the time to April 30 for submitting bids for the clearing, grading and bridge work on the extension of 31 miles between Hawk Lake Junction, Ont., and Hobon, on the Canadian Pacific. (April 15, p. 1014.)

According to press reports location surveys will be made this summer by the Copper River & Northwestern for an extension from Chiltina, Alaska, north to Fairbanks, 250 miles. The line is now finished from Cordova north to mile post 102. (Dec. 17, p. 1213.)

An officer of the Tonapah & Tidewater writes that location survey has been made from a point on the Bullfrog & Goldfield Railroad, about two miles south of Cuprite, Nev., north to Ely. A re-survey is to be made of part of the route. Contracts for building the line have not yet been arranged for.

J. L. Fagan has been appointed master mechanic of the Denver & Rio Grande, with office at Grand Junction, Colo., with authority over the second district of the Second division and over the second district of the Third Division between Grand Junction, Somerset and Montrose, succeeding C. M. Hoffman, resigned.

The stockholders of the New York Central & Hudson River Railroad, at their annual meeting on April 20, at which 1,500,000 shares were voted, elected W. K. Vanderbilt, Jr., Lewis Cass Ledyard and Marvin Hughitt to fill vacancies caused by the deaths during the year of D. O. Mills, H. McK. Twombly and E. H. Harriman.

F. B. Seymour, superintendent of the Green Bay & Western, the Kewaunee, Green Bay & Western and the Ahnapee & Western, at Green Bay, Wis., has been appointed general superintendent of those roads and the Iola & Northern, with office at Green Bay, and H. E. Dutton has been appointed assistant purchasing agent of the four roads, with office at Green Bay.

A contract is said to have been given by the Bessemer & Lake Erie to T. A. Gillespie & Co., Pittsburgh, Pa., for grading and masonry on four miles of second-track work between Red Raven, Pa., and Russelton. The work includes the construction of arches under viaduct No. 12 and filling the same, and completing the fill at viaduct No. 13. The estimated cost of the improvements is $90,000.

Representative Mann, chairman of the Committee on Interstate and Foreign Commerce, has introduced in Congress a bill limiting the hours of labor of railway employees to fourteen hours daily, and providing for a ten-hour period of rest. This would modify the present law by making the working limit two hours shorter and the minimum rest time two hours longer.

Bids are wanted by William Garstang, superintendent motive power of the Cleveland, Cincinnati, Chicago & St. Louis, at Indianapolis, Ind., April 30, for improvements to be made at Beach Grove, Ind., at a cost of about $1,000,000. The plans provide for a complete water works system, including sewers, water and fire line, conduits for heat and power, and a reservoir and other facilities. The contracts for the work are to be let as soon as bids are received and considered. (See Beach Grove, Ind., under Railway Structures, Feb. 18, p. 383.)

Franchises are said to have been granted the Detroit, Lansing & Grand Rapids covering the entire route for an electric line from Detroit, Mich., northwest via Lansing to Grand Rapids, about 150 miles. It is probable that two lines will be built from some point in Eagle township to Lowell, one north to Portland, thence west via Saranac and Lowell to Grand Rapids, and the other west from this proposed junction point in Eagle township to Lake Odessa, thence to Lowell. H. M. Wallace, vice-president, and F. A. Bean, chief engineer, Detroit. (Sept. 17, p. 520.)

An officer of the Greenville & Spartanburg writes that surveys are not yet completed for an electric line from Greenville, S. C., via Greers, Taylors, Duncans, Fair Forest and Spartanburg junction to Spartanburg, about 32 miles. It has not been decided when contracts are to be let for the work, but it is expected to start the construction soon. There will be several bridges. E. H. McCullough, Greenville, may be addressed. (See Greenville, Spartanburg & Anderson, Jan. 14, p. 113.)

The Chicago, Rock Island & Pacific has ordered 50 steel underframe refrigerator cars from the Milwaukee Car Manufacturing Company; 200 steel underframe refrigerator cars fom the American Car & Foundry Company; 800 forty-ton box cars from the Pullman Company; 200 fifty-ton ballast cars from the Rodger Ballast Car Company; 500 stock, 500 furniture, 20 smoking cars, 20 three-compartment passenger cars, six baggage and mail cars, seven passenger cars and four postal cars from the American Car & Foundry Company, and five dining cars from the Pullman Company. All of the passenger equipment will be of steel.

The directors of the Lehigh Valley at a meeting in Philadelphia April 20 voted to recommend to the stockholders that the common stock of the company be increased from $40,334,800 to $80,000,000. A meeting of the stockholders has been called for June 22.

If the stockholders approve the directors propose thereafter to issue immediately $20,167,400 of stock, giving the present shareholders the right to subscribe pro rata at par for 50 per cent. of their holdings. The balance of the authorized increase will be reserved for future needs. The money received from the $20,167,400 of stock will be used for the retirement of $6,000,000 second mortgage 7 per cent. bonds, maturing September 1, 1910, for the retirement of other obligations of the company and for other purposes.

New through trains between New York city and Williamstown, Mass., and between New York and Keene, N. H., will be introduced with the summer schedules of the New York, New Haven & Hartford and the Boston & Maine. The train between Williamstown and New York will go on June 13 and the Keene train will be run after June 20. The Williamstown train will run by way of North Adams, Greenfield and Springfield. It will leave Williamstown at 7:35 a.m. and will be due in New York at 12:55. Returning, it will leave New York at 1:31 and be due in Williamstown at 6:50 p.m. Electric cars (on a line controlled by the New Haven) to and from Bennington, Vt., will connect with this train. The Keene train will leave New York at 11 a.m. and reach Keene at 5 p.m.; leave Keene at 2:20 p.m. and reach New York at 9 p.m.

Work has been started at La Union, Salvador, on the eastern division of the Pan-American Railroad, and the occasion was this week celebrated with banquets throughout the eastern part of the republic. The concession was granted to Miner C. Keith and Bradley M. Palmer, of the United Fruit Company.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Chicago, Milwaukee & St. Paul is in the market for 25 Mallet locomotives.

The Lehigh Valley has ordered five Atlantic type locomotives from the Baldwin Locomotive Works.

The New York Central & Hudson River has ordered six suburban locomotives from the American Locomotive Co.

The Pennsylvania Railroad has ordered 80 consolidation freight locomotives from the Baldwin Locomotive Works.

The Miller-Link Lumber Co., Orange, Tex., has ordered a 55-ton locomotive from the Lima Locomotive & Machine Co.

The Oregon Short Line is said to have ordered 47 locomotives from the American Locomotive Co. This item is not confirmed.

The Chicago, West Pullman & Southern has ordered two six-wheel switching locomotives from the Baldwin Locomotive Works.

The Southern Georgia & West Coast is reported to have ordered two 10-wheel locomotives from the Baldwin Locomotive Works. This item is not confirmed.

The Brownwood Southwestern, Brownwood, Tex., a new line under construction through Brown and Coleman counties, expects to buy motive power about June 1.

The Baltimore & Ohio, reported in the *Railway Age Gazette* of February 4 and 18 as figuring on a number of locomotives, has ordered 90 locomotives from the American Locomotive Co.

The Chicago, Milwaukee & St. Paul has ordered 20 Pacific locomotives from the American Locomotive Co. These engines will be duplicates of the 50 ordered from the same company, as reported in the *Railway Age Gazette* of October 29, 1909.

CAR BUILDING.

The Missouri, Kansas & Texas has ordered 75 side dump cars from the Wm. J. Oliver Co.

The Union Railroad is said to be figuring on 1,000 ore cars. This item is not confirmed.

The Interborough Rapid Transit Co., New York, is in the market for 100 steel subway cars.

The Baltimore & Ohio is said to be figuring on about 18,000 freight cars. This item is not confirmed.

The Brownwood Southwestern, Brownwood, Tex., a new line under construction through Brown and Coleman counties, expects to buy rolling stock about June 1.

The New Orleans Railway & Light Co., New Orleans, La., reported in the *Railway Age Gazette* of April 8 as figuring on cars, has ordered 50 electric cars from the St. Louis Car Co.

The Northern Pacific has ordered, from the American Car & Foundry Co., the 25 passenger refrigerator cars for which it was reported in the market in the *Railway Age Gazette* of March 4.

Y. Alexander, president of the Third National Bank of Lexington, Ky., contemplates the purchase of one gasolene or gasolene-electric motor car for use on a short steam railway in northern Kentucky.

The Colorado & Southern is reported to be building 175 box cars, 50 coal cars and 15 caboose cars at its Denver shops. The box and coal cars are narrow gage and the caboose cars standard. This equipment was included in the inquiry recently issued by this company, as reported in the *Railway Age Gazette* of March 11. This item is not confirmed.

The Denver, Northwestern & Pacific, as reported in the *Railway Age Gazette* of March 11, has ordered 25 flat cars, 50 stock cars, 150 box cars, 6 refrigerator cars and 275 gondola cars from the Pullman Co. The special equipment includes:

Axles	Pullman
Bolsters, body	Cast with underframe (Bettendorf on refrigerator cars)
Bolsters, truck	Steel
Brakes	Westinghouse
Brake-beams	Creco
Brake-shoes	A. B. S. & F. Co.
Brasses	A. B. C.
Couplers	Sharon 5 in. x 7 in.
Draft gear	Miner tandem
Dust guards	Positive
Journal boxes	Cast with side frames (Symington on caboose)
Paint	Sherwin-Williams
Side bearings	Cast with bolster (Woods roller on caboose)
Springs	Railway Steel Spring Co.
Trucks	Bettendorf
Uncoupling device	Carmen
Wheels	Griffin

MACHINERY AND TOOLS.

The Republic Iron & Steel Co. has ordered from the Case Crane Co., Columbus, Ohio, 12 electric cranes for its tube mills at Youngstown, Ohio. The Cranes range in size up to 50 tons, with a span of 115 ft.

IRON AND STEEL.

Toledo & Ohio Central.—See Hocking Valley.

The Erie is taking prices on 800 tons of bridge steel.

The Central of New Jersey is in the market for 200 tons of bridge steel.

The Chicago, Rock Island & Pacific is in the market for 500 tons of bridge steel.

The New York, Chicago & St. Louis is in the market for 1,600 kegs of spikes.

The Chicago, Burlington & Quincy is taking prices on 400 tons of bridge steel.

The Southern has ordered 700 tons of bridge steel from the Phoenix Bridge Works.

The Lake Shore & Michigan Southern is in the market for 650 tons of bridge steel.

The New York, New Haven & Hartford is in the market for 2,000 tons of bridge steel.

The Northern Pacific has ordered 300 tons of structural steel from the Lackawanna Bridge Co.

The Philadelphia & Reading is in the market for 600 tons of structural steel for an office building.

The Atchison, Topeka & Santa Fe has ordered 300 tons of bridge steel from the American Bridge Co.

The Pennsylvania Lines West have ordered 200 tons of bridge steel from the American Bridge Co.

The Boston & Maine is said to have ordered 11,000 tons of heavy rail sections from the Pennsylvania Steel Co.

The Hocking Valley and the *Toledo & Ohio Central* have ordered 1,600 tons of structural steel from the McClintic-Marshall Construction Co. for joint work at Columbus, Ohio.

The New York, Chicago & St. Louis has ordered 1,500 kegs of spikes from the Jones & Laughlin Steel Co., 5,000 tons of 75-lb. rails from the Lackawanna Steel Co., 14,000 rail joints from the Rail Joint Co., and 350 kegs of track bolts from the Lake Erie Iron Co.

General Conditions in Steel.—Following the announcements of general increases in wages by a number of the railways comes a similar announcement by the United States Steel Corporation. Although the final decision has not been given out, reports indicate that it will amount to 6 per cent. and

will be effective May 1. At the recent meeting of the presidents of the U. S. Steel subsidiary companies, the feeling was expressed that no material changes in finished steel prices in the next six months was expected. Reports are that practically all of the independent steel mills are assured of steady operations for the next four months with the orders which are now on hand.

SIGNALING.

The Union Pacific has just completed the installation of automatic block signals between Topeka, Kan., and Ogdensburg, 120 miles, single track.

The Cleveland, Cincinnati, Chicago and St. Louis is about to equip 32 miles on the Indianapolis division with telegraph block stations. Each station will be an interlocking plant to handle adjacent switches.

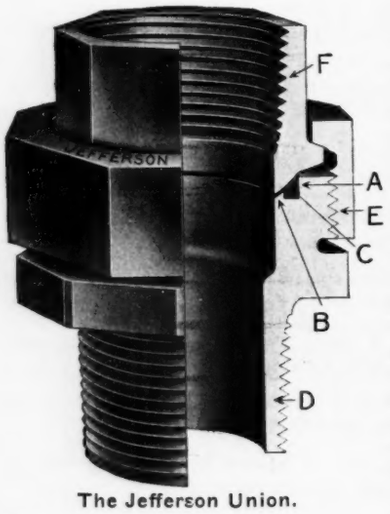
The C., C., C. & St. L. will also shortly install a combined mechanical interlocking plant and block station at Greencastle, Ind., and has under consideration a power interlocking plant at Springfield, Ill., to control about 100 functions.

The Rock Island has just put in service three-position, upper-quadrant, automatic block signals on 13 miles of single track between St. Joseph, Mo., and Rushville. There are 32 signals, two of which are dwarfs, dwarfs being used because of the excessive cost of installing high signals in a yard. Switch indicators are used at all switches remote from signals and in all other respects the installation is in accordance with the Rock Island standard practice as heretofore outlined. The section of track in question is used jointly by the Rock Island, the Santa Fe and the Missouri Pacific.

The Jefferson Union.

The accompanying illustration shows a new style male and female union, made by the Jefferson Union Co., Lexington, Mass.

The fitting is made of malleable iron and has a brass ring, A, which is embedded in the lower part of the union. This brass ring forms the seat or contact. As this ring is made from seamless brass tubing, it contains no blow holes to start leaks, as is often so with cast brass. The iron wall, B, is designed to absorb the heat and distribute it through the iron of the union, protecting the brass, as much as possible, from the temperature changes. The part, F, is free to move in the nut to provide for making a joint in piping which is not in alinement. The Jefferson union is made short so as to be applicable to short connections. Although made very short, any style of wrench with any width face may be used. The octagon flats of all three parts are so arranged that there is no interference. In the clamping nut the flats are outside and clear of the corners of the part D, having the external thread. On this part, D, the flats are outside and clear of the nut threads.



The Jefferson Union.

Poage Automatic Float Valve.

The accompanying illustration shows an automatic float valve made by the American Valve & Meter Co., Cincinnati, Ohio. It may be placed near the bottom of the tank or near the top, in which latter case it is easily accessible without letting the water out of the tank.

The body is a hollow cast iron shell, lined with hard brass. This brass lining is made with a series of ports, as is the key which operates in it. In filling the tank the ports of the operating key coincide with those of the lining. The water passes through the ports and out of both ends of the operating key into the tank, and, as the latter fills, the float lifts the lever fixed to the end of the operating key, gradually closing the openings through the lining. When water is drawn from the tank the reverse operation takes place, opening the valve.

As the opening and closing require but little movement there is little wear on the working parts of the valve and the key and lining are made tapering to provide for taking up any wear which does occur. Provision against shock on the main is made by having the valves open and close gradually.

Poage Automatic Float Valve.

This valve is made for connection to 2-in., 3-in., 4-in. and 6-in. wrought iron pipe of standard threads, although special connections will be furnished if desired. It is also furnished with an all-brass body in the 2-in., 3-in. and 4-in. sizes. The Poage automatic float valve complete includes the valve, galvanized iron float, brass chain, valve lever, lever weight and stuffing box for the tank. A copper float will be furnished if desired.

FOREIGN RAILWAY NOTES.

The Bababoya & Guayanda, incorporated in West Virginia, is to build a 40-mile electric line in Ecuador. The company has an authorized capital stock of $1,380,000, and the incorporators are Julio H. Cardon, of Guayaquil, Ecuador, and Benjamin F. Patterson, James G. Pugh, Martin H. K. Paulsen and John B. Timmerman, of Baltimore.

Negotiations are under way in regard to the extension of the Chinese Railway from Hsinmintun into the city of Mukden as far as the western gate, where the line would connect with the Antung-Mukden line. This would make the Antung line a feeder of the Chinese railway instead of the South Manchuria, and it is possible that the Japanese will hesitate about sacrificing this traffic.